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Photograph by Vivian Akers

THE YOUNG WALTONIAN

AMERICAN FORESTS

OVID BUTLER, Editor

L. M. CROMELIN and ERLE KAUFFMAN, Assistant Editors

Published Monthly—35 cents a copy—$4.00 a year

1727 K Street Northwest
WASHINGTON, D. C.

Vol. 38 APRIL, 1932 No. 4

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The EDUCATION OF THE PUBLIC, especially school children, in respect to our forests and our forest needs; a more aggressive policy of RESEARCH AND EDUCATIONAL EXTENSION in the science of forest production, management, and utilization, by the nation, individual states, and agricultural colleges; reforms in present methods of FOREST TAXATION, to the end that timber may be fairly taxed and the growing of timber crops increased.

Member A. B. C.

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"Awake, awake; put on thy strength, O Zion; put on thy beautiful garments, O Jerusalem, the holy city....In the wilderness shall the waters break out and streams in the desert. And the glowing sand shall become a pool and the thirsty ground springs of water....break forth into singing, ye mountains, O forest, and every tree therein, for the Lord hath glorified himself in Israel."—Isaiah.

AMERICAN FORESTS

Vol. 38 APRIL, 1932 No. 4

THE PARTNERSHIP OF WOOD AND WATER

By DR. HANS BURGER
Swiss Forest Institute

FOREWORD

By ARTHUR C. RINGLAND
Forester, United States Foreign Agricultural Service

Switzerland expends several millions of dollars a year in its defence against the ravages of natural phenomena; for the control of avalanches, landslides, mountain torrents and floods along the lower reaches of water courses. Water is a valued servant and has displaced coal as a source of power. Soil fertility is jealously guarded, for Switzerland, ever mindful of the necessity to import the greater part of its food supply—a fact painfully brought home during the World War—spares no reasonable precaution to safeguard its agricultural lands.

In all of this practical work of conservation forestry plays a recognized and integral part. The forester, the farmer and the engineer work together intelligently with the aid and the cooperation of the Federal and Cantonal governments. The forests of the mountain watersheds are classified as protection forests. Their economic use is not denied but such use is subjected to careful restrictions to curb soil erosion, avalanches and flood waters. Here the foresters carry out extensive works of afforestation, dam construction, correction of torrents, and prevention of avalanches, in coordination with the work of the engineers in the valleys below where extensive dam construction and dredging are necessary, and where walls and wing dams must be constructed along the river banks to prevent damage during the periods of high water.

There was a time when the Swiss engineers were inclined to minimize the influence of forests on streamflow. Thirty years of precise measurements of the run-off of completely forested watersheds as compared to the run-off of watersheds subjected to abuse through over-grazing, unregulated cutting or ill-advised cultivation, have accumulated such overwhelming evidence that not only professional opinion but Swiss public opinion recognizes "the partnership of wood and water." The pioneer work of Dr. Engler of the Federal Forest Experiment Station, and now so brilliantly continued by Dr. Burger, has borne fruit. In America this partnership is yet to be recognized. We continue to expend millions for the control of waters through the construction of engineering works along the lower reaches of our rivers with little or no thought given to the influences of the upper watersheds, and we continue to tolerate the loss of soil fertility over millions of acres.

Not long ago it was my privilege to accompany Dr. Burger in an inspection of the Rappengraben and Sperbelgraben watersheds, the scene of the streamflow experiments of the Swiss Forest Experiment Station. While these classical experiments are well known to many professional foresters the results obtained are so impressive that at my suggestion Dr. Burger has contributed this article to AMERICAN FORESTS *in the hope of furthering "the partnership of wood and water" in America.*

HISTORIANS and geographers teach us that the ancient cultivated countries on the Mediterranean were far more fruitful when their hills and mountains were still covered with vigorous forests. The quickly increasing population of those days, however, mercilessly destroyed the forest in order to increase the area of the cultivated land and to obtain wood for houses and ships in the easiest possible manner.

Spain, Portugal, Italy, Greece, Asia Minor and parts of Northern Africa, which in earlier times seem to have been paradises of fruitfulness, are now partially laid waste. Canaan, the land that flowed with milk and honey, is today an arid and desert district. Of the cedar forests of Lebanon, with whose wood Solomon built the temple, there are now only sparse remnants.

The forests in all these countries have, to a large extent, disappeared. Mountains and hills are covered chiefly with poor pasture lands, whose hardened surface does not allow the precious rain to penetrate into the soil. In the rainy seasons mountain brooks and rivers become swollen torrents, carve out deep river beds, cause landslides, harmful floods and cataracts of stones and boulders. Little water enters the soil, almost all flows away on the surface and soon after the rainfall the river beds have turned to arid deserts and the few springs are sealed up.

Even the ancient investigators, with real feeling for na-

Watershed of the Sperbelgraben, almost completely forested with silver fir, Norway spruce and beech,—where thirty years of Swiss stream-flow studies have shown floods to be only one half as high as in the less heavily forested watershed of the Rappengraben.

ture, established through observation that these changes in climate, this desolation of districts and countries which had earlier been paradisically fruitful, these extremes of drought and flood, could only be the result of the reckless destruction of the forests.

In Switzerland too floods and landslides have increased greatly in the course of the centuries. Because of the increase in population, the forests in the plains and on the lower slopes of the mountains have given way to cultivated lands. In the mountains the herds of goats, sheep and cattle, always increasing, have hindered natural sowing and regeneration in the forest (particularly in localities where the natural conditions had already been rendered unfavourable through other causes).

By examination it was proved that through the influence of men and their cattle the upper forest boundary had, in the course of the centuries, been pushed back in many valleys about 300 to 1,000 feet, and that in other districts mere ruins of the once luxurious forests remained. To the destruction of part of our forests is attributed the growing damage done by inundations and landslides.

Our Swiss Forest Research Institute has undertaken to examine this question. At the beginning of this century it chose two small valleys in the Emental mountains —or, as they call them there, two "Graben" — the Rappengraben and the Sperbelgraben. The Rappengraben is only one-third wooded, the Sperbelgraben almost completely covered by forests. For over thirty years rain and snow have been measured here with special instruments; automatic installations have noted continuously the volume of water that drained away, and in specially built basins all the stones and boulders washed down in each valley were held back and measured. Observations were made as to how the water moved in the earth, and the number of landslides which occurred in each valley.

It was established that in great storms the mountain stream of the Sperbelgraben never rose so quickly and only reached to one-third or one-half of the high water mark of the Freilandbach in the Rappengraben. Also in thaws in winter, or when the snows melted in the spring, the wooded brook never rose as high as the unwooded brook. The wooded brook also brought down fewer stones than the unwooded brook, and on the wooded slopes of the Sperbelgraben there were no landslides, while in the pastures of the Rappengraben fresh landslides broke away every year and the piles of stones in the valley grew larger.

How can one explain the beneficent levelling influence of the forests on the stream flow and on the amount of soil wash and gravel?

Let us imagine a valley completely overlaid with lead, so that nearly all the water of one rainfall runs off at once. None can soak in and only very little can evaporate. The rain water would in a very short time reach the bottom of the valley from the highest watershed. Each fall of rain

Only thirty-five per cent of the watershed of the Rappengraben, another Swiss streamflow experiment, is forested, principally with Norway spruce and alder. The open land is used chiefly for grazing.

would quickly fill the stream bed to high water mark, and very soon after the rain had ceased the stream would have run dry. There would be no springs at all.

If the ground in the same valley were still non-porous, but planted with a vegetation of grass, bushes and woods, then at least part of the falling shower would be caught by the plants and would evaporate. The total leaf surface of grasses and herbs of the pasture and of natural meadows that can catch and hold moisture is small; they can therefore not hold so much water on their stems and leaves as bushes, and especially as trees or whole forests. After many examinations it is found that the trees of a forest, according to the species of tree and the density of the forest, will hold back twenty to forty per cent of the rainfall, so that it never reaches the ground but evaporates and increases the humidity of the air.

A section of the poorly forested and grazed watershed of the Rappengraben. The earthslides were caused by overgrazing.

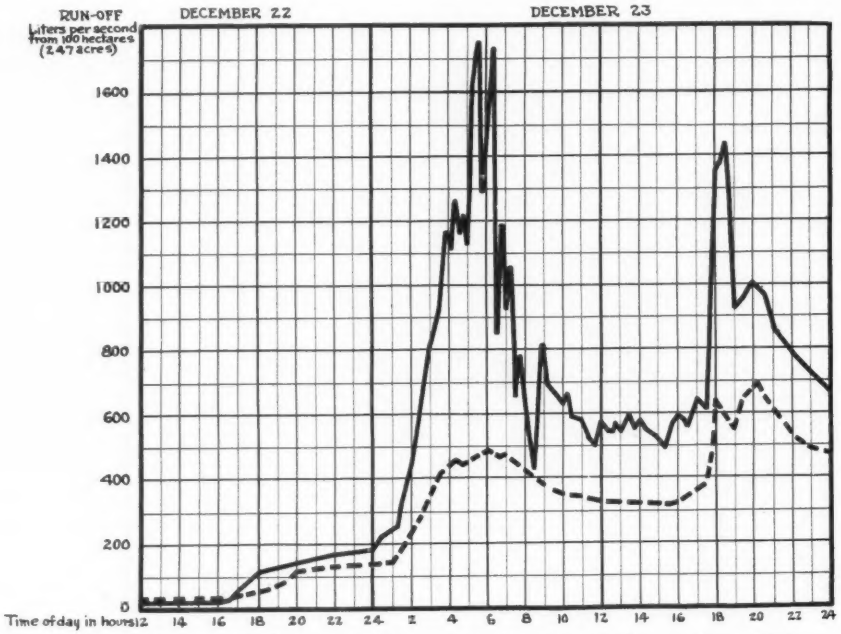
The covering of plants has still another influence. Stems, trunks and the leaves on the ground form obstacles to the water that is trying to flow away on the surface. Thus the surface flow is hindered. The water from the higher slopes reaches the stream beds later, high water is not so great because the supply of water is spread over a far longer period.

If we have to do with a natural valley, we have to take into consideration the fact that the ground is more or less loose and porous and therefore allows part of the rainfall to soak in. The volume of water which is not withheld by the vegetation divides itself into the water that runs away over the surface and the water that soaks into the ground. High water and floods are caused chiefly by the water flowing away on the surface. So the looser and more porous the ground of the valley, the more rainwater will soak into the earth and the danger of floods be diminished. What happens to the water that sinks into the ground? Part of it remains in the surface soil and clings to the capillary pores as though in a sponge. It is therefore called captive water, or capillary water. Another part of the water that sinks into the earth is drawn down by gravitation through larger pores and channels into lower layers of the ground. This water is called "sinking" water, or gravitation water. The captive or capillary water that remains in the higher layers of the earth partly evaporates directly in dry weather, and is partly used and given off by the plants. This water, therefore, never flows away. It enriches the air by its moisture and helps to make sufficient dew. The "sinking" water in the lower layers of the ground moves only very slowly through the earth. It is in a measure treasured up. It emerges according to the circumstances either at the end of some hours, days or even months into the streams. The gravitation water, therefore, does in the end flow away, but usually after the surface rainfall of one shower has long since run off. The gravitation water forms springs and ground water, which fill our streams and rivers in the long periods of drought or frost.

These earthslides in agricultural fields near Bigenthal were caused by a hailstorm with about four and one-third inches of precipitation. The even, steeper slopes covered with forests show no damage.

If the subterranean reservoirs are large, they can take in more water in the rainy seasons, thus lessening the danger of floods and ensuring larger, more enduring springs to bubble up during the droughts and frosts. When nothing but a thin layer of weather worn earth lies on the hard, im-

permeable rock, the water reservoir is of course small, and relatively little gravitation water can be held; a great deal of water runs quickly off; high water is soon reached and the few poor springs soon seal up and allow the rivers and streams to dry. If, on the contrary, the underground rock is furrowed and porous, the reservoir space is large and a considerable quantity of the rainfall can be taken up. The fear of flood is lessened and continuous springs feed the rivers and streams in dry or frosty weather.

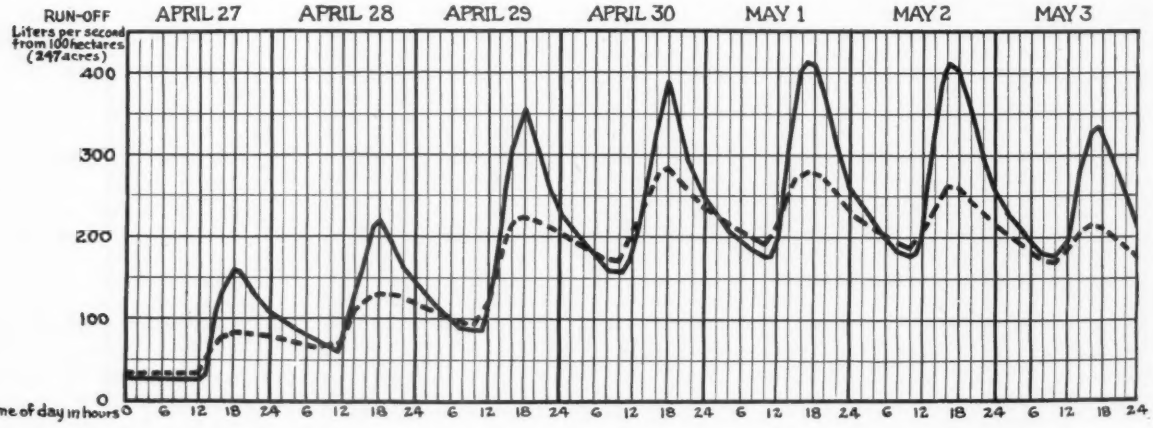


This graph shows the discharge caused by a warm rain of about three and one-third inches, falling upon a snowfield of about eight inches, December, 1918. The maximum run-off from the poorly forested and grazed Rappengraben watershed (note solid line) is from three to four times greater than from the completely forested Sperbelgraben (note broken line).

The size of the water reservoirs for "sinking" water is therefore not dependent on the vegetation, but is established by the geology of each district. The best reservoir is, however, useless when the channels to it are stopped up. Here lies the chief influence of the forest on the surface flow.

When the ground is naturally thickly covered with plants, it has roots cutting through the soil. The roots form by their growth pipes and channels in the earth, so that it becomes looser and more porous. It is easy to see that the thin grass mantle of a pasture, with its small, weak roots which hardly make any impression on the earth, cannot loosen the ground. The small grasses and herbs of the pasture also offer very little protection, and any sign of a natural loosening of the earth is always destroyed by the continual trampling of the grazing cattle, so that the pasture ground always remains hard and impermeable. In the hay meadows conditions are a little better. The plants are larger, send their roots deeper, the hardening of the ground through the trampling of cattle is less likely, and during part of the year the high grasses protect the earth from the direct beating of the rain. In a thickly planted hay field a large part of the shower of rain is caught by the high, dense grass stems; the many stalks hinder the rapidity of the surface flow of the rainfall, whereby the sinking in of the rest of the water is made easier. Even more favourable is an uncultivated natural meadow.

If a district in Switzerland is no longer in any way cultivated, it soon seeds itself with larger herbs and bushes and finally, if left entirely to nature, becomes forest land. The roots of the forest trees penetrate into and loosen the soil, according to circumstances, to a depth of one, two or three metres. The surface of the earth is prevented from hardening



Showing the discharge of melting snow, without precipitation, in the spring of 1917. The daily variations in the discharge are much greater for the Rappengraben watershed (solid line) than on the completely forested Sperbelgraben (broken line). The peaks of variation are always higher and in most cases lower in the Rappengraben.

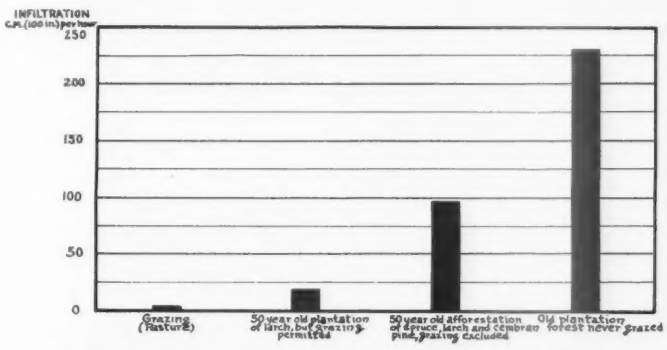
by the covering of fallen leaves and needles, and through the crowns of the trees. The ground of a well-kept forest is loose and porous, and can absorb a great deal of "sinking" water.

Many hundreds of experiments, carried out all over Switzerland, show that pasture lands are almost non-porous. Three to five times better is the permeable earth of the hay field and ten to thirty times better that of good, uncultivated forest floors.

If heavy rain falls on a pasture, very little water remains on the vegetation and it can only with difficulty penetrate into the earth and reach the subterranean reservoirs because of the hardness of the ground. Most of the water runs quickly over the surface and causes floods in the streams and rivers.

If the same shower falls on well cared for forest land, most of the water can sink into the loose earth, move slowly through the ground and emerge only through springs, when the stream flow has long since run off. In this way the forests can greatly diminish the danger of floods.

If it rains for many days at a time, the storage capacity of the forest soil can on exceptional occasions be exhausted, and therefore as much water flows away from a wooded district as from an unwooded district. This, however, occurs very rarely.



Showing the influence of vegetation on the amount and rapidity of infiltration into the soil. On grazed lands the infiltration ratio is very small for the greater part of the rainfall runs over the surface directly into the streams causing dangerous floods. In good forest soil nearly every rain can infiltrate, for the greater part of the water moves through the soil curbing the height of floods.

In their upper course all rivers have the tendency to carve out deeper river beds. The banks therefore become steeper and steeper, till they eventually begin to slip or to be worn away. The river carries the sediment down with it on its course, depositing it at last in the valley, where the water moves more slowly. It thus raises the river bed to such an extent that the water breaks out at the sides and floods fruitful districts, depositing piles of the sediment. Only by building barriers across the river can one make it impossible for the river to cut a deeper bed.

The banks can be held together if they are always completely covered with plants. Every shower of rain sweeps earth off a bare surface, till there is nothing left but the rocky foundation. The rivers always carry a great deal of soil washed from the pasture lands because the earth is partly cut by the trampling of the cattle and because most of the rainfall flows away over the hardened ground. Thickly planted grass fields can hinder the fruitful earth from being carried away. Even better are shrubs, trees or vigorous forests, which drain the earth and at the same time bind it with deeply penetrating roots. Slopes planted with woods can withstand far steeper river banks than unwooded slopes. For a successful struggle against mountain torrents and inundations in the plains, a complete collaboration of engineers, agriculturists and foresters is an absolute necessity.

It will be asked why Switzerland, with good forest laws for the protection of her mountain forests, still has devastating floods in the rivers from time to time. The answer is that the percentage of wooded land in the mountains is comparatively small, because a large part of the catchment basins lie above the limit of the growth of forests.

The Rhine district in Graubünden is only eighteen per cent wooded and forty-three per cent of the area lies above the forest limit. The whole of the Engadin down to the Swiss frontier is only thirteen per cent wooded and seventy per cent of the district lies so high that no forests can grow there. The catchment basins of the Reuss up to the Vierwaldstättersee has only nine per cent forest and sixty-six per cent of the area lies above the forest limit. The Swiss Rhone valley as far as the Lake of Geneva has sixteen per cent forest, and fifty-four per cent of the district is so high that it could never be wooded.

In the last fifty years Switzerland has newly afforested 16,956 hectares of land in dangerous catchment areas, which, however, amounts only to about 0.4 per cent of the land area. It is evident that with this 0.4 per cent of new forest not all floods can be prevented. It has also to be taken into consideration that Switzerland produces only one-quarter to one-third of her food provisions herself, and it is therefore difficult to withdraw large tracts of cultivated land for afforestation.

But the Swiss nation has realized the importance of protecting its forests. A law, adopted by popular vote, demands that the wooded areas of Switzerland never be diminished. In the protection forests of the Alps even the private proprietor cannot fell a tree without the permission of the forest superintendent. As a compensation for this reduction in the rights of possession the State subscribes large sums to the building of roads and to afforestation in the protection forest districts.

Just because, for economic and climatic reasons, the wooded area of Switzerland canot be much increased, it is absolutely necessary that we protect and care for our present forests. We must see to it that they regenerate properly and that the young plants are not destroyed by grazing animals. We must also take care that the forest floor does not become hard and must therefore never allow cattle in the protection forest except in time of real necessity.

Only a vigorous and well kept forest, made up of the proper species of tree, can lessen the fear of flood and only a well kept forest can ensure keeping the earth in a correct condition to conduct large volumes of quickly sinking water to the underground reservoirs which feed our rivers in time of drought or frost, work the mills, the sawmills, the factories and the electric power plants.

May it be possible for our great sister republic to protect her forests against further destruction, before it is too late; otherwise new forests will have to be created, at tremendous cost, for the protection of the many millions of people who live on the lower course of the rivers.

FEATHERS OF THE OKEFENOKEE

In the Okefenokee—"back of beyond"—where things are found largely as the Creator made them, untouched by the hand of man.

WHEN FIVE MONTHS OF DROUGHT OPENED DOORS INTO HITHERTO UNPENETRATED WILDS OF BIRD LAND

By

CHARLES NEWTON ELLIOTT

OCTOBER in the south marks the beginning of fall. It is then that the sun swings into southern skies, the green cypress needles fade to a burnt golden brown, the nights become clean and cool once more, and the air is astir with birds winging southward, some bound for tropical Florida, some for lands beyond the waters of the Gulf of Mexico, others for winter homes below the equator in South America. To hundreds of thousands of these birds, the inland fresh water swamps of the southern states are airports on the airlines to the tropics.

The Okefenokee swamp—600,000 acres of watery wilderness lying on both sides of the Georgia-Florida line—is one of the most interesting inland points in all the Southland to study birds and their habits. This is particularly true of autumn when the birds are changing their summer dresses and are becoming resplendently arrayed.

We were fortunate in selecting last fall for another exploration trip into the Okefenokee swamp because heretofore unpenetrated routes were open to us. For five months during the summer and fall no rain had fallen. The prolonged drought had laid its desecrating hand over the swamp. The famous Suwanee River that rises in the Okefenokee and is usually ten feet deep at the Griffis Place below Billy Lake was only a few inches in depth. The sheet of swamp water that normally covers three to four hundred thousand acres was drawn down to a few lakes and ponds, leaving exposed and open to exploration an enormous area of land, some of which had probably never before been dry.

We spent fifteen days in the swamp. They were more valuable than many months during normal or high water. We camped on the shores of Minnie Lake at a spot where I had never seen the water less than four feet in depth. We went on foot into the open prairies where, on previous trips, we had to use canoes; on foot we pushed our way through tangled, matted, semi-tropical growth back into areas where probably no white man had ever before been. It would have been impossible to travel some of our routes by boat and insanity to attempt it on foot during normal water conditions because of the jungle. A rare opportunity was before us—an opportunity that might not come to a man again in many lifetimes—and we determined to avail ourselves of it.

There was an urging in our hearts to get away from the tracked lanes and even the infrequently traveled water routes, and to penetrate "back of beyond,"

The Osprey, called the Fish Eagle by the natives of the Okefenokee. This swamp is the only place these birds have ever been found to breed away from salt water. They place their nests in high, commanding positions.

Because of the long drought, hitherto unpenetrated routes were open for exploration in the Swamp. This open prairie formerly lay under water, the water line being plainly visible on the trees and shrubbery in the background.

The shores of Minnie Lake, where our explorers camped for fifteen days during their trip to the Southland to study the birds and their habits at home in the inland fresh water swamps, of which Okefenokee is one of the most interesting and outstanding.

to see things as the Creator had made them, untouched by the hand of man. There was a hope in our breasts that we might find wild life that was said to be extinct because it had disappeared from the eyes of the civilized world.

The Okefenokee was one of the last strongholds of the Florida wolf and the eastern panther. So it is the wilderness in which several vanishing species of birds have chosen to make their last stand. Why it is that one race should be doomed and another that is almost identical in appearance, size, habits, food and locality be destined to live on prolifically is beyond human understanding. But such is the case with two species of woodpeckers and two species of cranes inhabiting the swamp. Such it is also with the Trumpeter Swan and the Whistling Swan.

Perhaps the most interesting bird found in the Okefenokee is the Ivory-billed Woodpecker. In size and appearance and flight he closely resembles the Piliated Woodpecker, with the exception of an "ivory" bill and wings that show a large patch of white toward the tips when he is perched on a tree. The white patch shows on both birds in flight. In building their nests, they make an elliptical rather than a round hole in the tree as do their cousins, the Piliateds. And rather than the loud "cow-cow-cow-cow" of the latter bird, the Ivory-billed is said to have a rather subdued, musical "yap-yap-yap" that closely resembles the notes of a tin horn.

The Ivory-billed was once well distributed over the vast and wild domain of the Okefenokee. The huge and ancient cypress tree was where it built its home. The gray, rough trunks, draped with Spanish moss, supplied the bugs and worms as food. A desolate land of forest and water and brush rarely penetrated by man, was its domain. Now the wilderness areas are not as wild as they once were, the cypress stands have been logged, the woods are no longer virgin and the Ivory-billed has taken his last stand in the heart of the Okefenokee, in the vicinity of Minnie Lake, a small area not touched by the logging crews. They have become silent, wary birds and a glimpse of one is a rare but delightful sight.

I was unable to locate the Ivory-Bills which I was told are breeding in the vicinity of Minnie Island. These birds were described graphically to me by Lem Griffis and several of the Lee boys who spoke of the bird's white bill, of the "tin-panny" noise they made, and of the "funny-shaped" hole in which they live. One of them said that he camped on the edge of Minnie Island during the spring and for several days while he was there he observed the birds which seemed to be breeding in a tree near his camp site. From their descriptions, I am sure that these natives actually saw the Ivory-Billed Woodpecker which is considered practically extinct. But I was unable to locate the spot described to me or to find any trace of the birds on account of the low water.

Less is known about this species of bird than any other bird in existence today. They are commonly thought to be very closely related to the Piliated Woodpecker, but in reality their closest living relative is the Imperial Woodpecker of Mexico. Like the raven, they have followed the wilderness to its last stand and they are a doomed species of birds. I have never seen a person who knew of a dead Ivory-billed and yet they are disappearing. Nature is strange in her ways.

The group of birds in the swamp that is perhaps the most interesting because of their size and distribution is the group

known as the wading birds, to which belong the Herons, Ibis and Egrets (known as plume birds). At breeding time these birds congregate in certain sections of the swamp to lay their eggs and raise their young. Thousands and thousands of them build their nests together in these large rookeries. As many as fifteen nests have been seen in one tree. The species seen at one of the largest rookeries include the Louisiana Heron, the Little Blue and Great Blue Herons, the Green Heron, the Black-crowned and Yellow-crowned Night Herons, the Egret and Snowy Egret, the Anhinga, Wood Ibis, Roseate Spoon Bill and Florida Cormorant.

Of the several rookeries found in the Okefenokee Swamp, the largest was on Minnie Lake Island, said to be the most inaccessible region of this vast wilderness. Here thousands of the birds congregate in the spring. The nests of all the species are so nearly alike that one cannot identify the nest and eggs unless he sees the bird on it. The nests are very crude in construction and arrangement, being as a rule, a great platform of loosely woven sticks and placed on almost any limb or fork in the tree. Another and smaller rookery occurs near the "run" from Billie's Lake to Minnie Lake, in a small clump of cypress trees between Dave Island and Billie Island. Another is found north of Minnie Lake Island near a lake called "Big Water" and one is located at Gum Slue near the canal east of Floyd's Island. Perhaps the smallest rookery in the swamp and one in which more Egrets build than any other bird is located at Dinner Pong Lake above Billie Island.

One of the wading birds, however, that does not nest with his kin in the rookeries is the Sandhill Crane. He builds out on the prairie, alone, using as nesting material the reeds and marsh grass. Unlike his cousins, the herons and other birds of the colony, which lay from four to six blue eggs, the eggs of this bird number only two and are brown in color. I have seen several Sandhill Cranes on various trips into the swamp and I always get a thrill when I hear their startled, vibrant "whoop-a-loop-a-loop" flung out across the marshland. At first I thought these notes came from the Whooping Crane, that is almost extinct, and is about twice the size of the Sandhill. Even when I learned my mistake, the thrill of seeing this bird was not in the least diminished.

Birds at home in the Okefenokee. Upper center is the Florida Barred Owl—by far the most common bird of the swamp. At the left center is the Anhinga—a very interesting bird said to be the missing link between the Herons and Cormorants, noted for its peculiar abilities and habits, described fascinatingly by the author. It is also known as the Snake Bird or Water Turkey. Right center is the Great Blue Heron, of the plume bird group, and below is an interesting, intimate study of the inquisitive Red-tailed Hawk.

On my trip into the Okefenokee last fall, I had a chance to study several birds which have always interested me greatly. Foremost among these is the Anhinga, commonly known as the Snake Bird or Water Turkey. This bird is said to be the missing link between the Herons and Cormorants. He has come down with the cypress and Alligator from the past and belongs to the land in which he lives. His diversified ability to fly, perch in trees, swim and wade, and his almost grotesque appearance as compared to our other dainty and graceful birds, seem to mark him as a herald from another age. When we frightened one of these birds out of a tree along the river bank, we never knew whether he would fly or dive. Several times when we appeared suddenly around a bend in the river and startled a Snake Bird from his perch in a tree, he would launch his clumsy body into the air, fly

blindly into a limb and fall into the water and we would not see him again. The Snake Bird is the only web-footed bird I know that persistently perches in trees. He builds his nest in the trees of the rookery with the Herons and other wading birds and seems at home under any condition to which he is subjected.

These birds are called Snake Birds because of their ability to swim through the water with only their eyes visible. The black plumage of their bodies blends with the black waters of the southern streams and makes them hard to distinguish, even by keen eyes. They are excellent swimmers, as evidenced by their diet of fish. We had a rare opportunity to study one of them that seemed to inhabit the "bonnet patch" (which is the native term for a patch of lily pads) across the lake from our camp. Between twelve and one o'clock every day we observed him on an old log near the shore. He would dive into the water and shortly afterward appear with a fish. Standing on the log, he would throw the fish into the air, catch it head first in his bill and swallow it. This little incident was repeated at almost the same hour every day that we were in camp on Minnie Lake.

Another of the interesting birds which I wished to observe on this trip into the swamp was the Wood Ibis. He is commonly known as the American Stork, closely resembling and near kin to the common Stork of Europe. Unlike the European Stork, however, that builds among the housetops of the villages, the Wood Ibis leads a life far from the smoke of cities. He is limited to the swamps of the southern states and, unlike many of his family, does not migrate but lives in the same locality season after season. The Okefenokee Swamp is probably the northernmost point of his occurrence.

Early each morning when the cold mists still clung close about camp, we could hear the whistling wings of great numbers of these birds going over. At night when the sun had gone down and the dusk became gray, they came back in little groups numbering from three to ten flying to their roosts on the open prairie. We became interested in knowing where these birds went during the day for we never saw one on the ground. So one day we set out, following the route they seemingly chose in the mornings. Several hundred yards from camp we jumped a bear that lumbered off to the southward. I climbed a tree to observe his progress and a few minutes later saw a great commotion about a mile away. The air became thick with circling, screaming birds. We wondered what could be the attraction for so many birds.

Due to the long drought, the water had fallen several feet below normal for that season and the swamp was especially dry. Fish that usually had the run of hundreds of thousands of acres of swamp were concentrated in the several lakes and ponds scattered over the area. Here in the open swamp, we found a shallow muddy lake holding literally thousands of fish. The depression so prevalent over the world was certainly not in evidence here. The wading birds and the avi-fishers such as the Kingfisher and Osprey were gorging themselves and building up their winter supply of fat. The Osprey is called the Fish Eagle by the natives of the Okefenokee. The swamp is the only spot they have ever been found to breed away from salt water. Their nests, several of which have been found in the swamp, are bulky masses of sticks located in the top of tall cypress or pine trees. All of these had high, commanding positions overlooking the marsh or forest.

Of the smaller migratory birds several are especially interesting. I had seen the Swallowtail Kite, that is perhaps the most graceful of all our aerial performers, in the swamp during the spring migration, but he could not be found in the fall. I later learned that he never visits the swamp except in the spring of the year. Of the smaller perching birds such as the Ruby-crowned and Golden-crowned Kinglets, the Catbird, Robin, Wrens, some of the Warblers, and Flycatchers, the Phoebe that belongs to this latter group, seems to be the most common. This friendly little bird was found along the lakes and streams in great numbers. I had known them in their spring and summer range in the mountains and had seen them around waterfalls, under cool, wet rock cliffs . . . . always near water. That they should choose a winter home such as the Okefenokee Swamp delighted rather than surprised me.

Two amusing incidents happened while we were in the swamp last fall. The first was with a hawk. One afternoon we had followed the trail of a bear far across the swamp into an area that is normally isolated from all human beings. It lay far back in the swamp near a little patch of high ground called Dave Island. No "runs," which are the boat trails of the swamp, go near this spot and during high water the brush of the low, scrubby Cassina Berry and Laurel is so thick that traveling in a boat is impossible. We had stopped to rest when Stevens, who was my *Companion-de-Voyage*, called my attention to a Red Shouldered Hawk perched in a Blackgum tree not twenty feet over our heads, regarding us curiously. We stared at him in return, for hawks in our part of the country do not keep their perch twenty feet from the head of a human being. The way he hopped around, regarding us, made me believe that he had never seen a man. We walked under the tree in which he sat and moved up the swamp, while he followed us flying from tree to tree over our heads. Seemingly satisfied, he flew away, leaving us to wonder what he thought of these strange creatures who dared invade his domain.

One night while we were on the lake, we heard a commotion in the bushes on the edge. I turned my powerful spot light in that direction and caught sight of a Florida Barred Owl, which is by far the most common owl of the swamp, thrashing in the laurel. A moment later a Kingfisher came screaming out of the undergrowth near the owl and flew up the river. The owl swept up to a nearby dead stub and sat there with squinted eyes, looking down at the light. Not being able to understand that blinding thing on the water, he turned his head away to get accustomed to the darkness. I squeaked like a mouse and Stevens splashed in the water with the paddle. The big, rounded head snapped again toward the light and looked at us a (*Continuing on page* 253)

An April Song

CHARLES HANSON TOWNE

Now, once more, the crocus flames,
The tulip lifts its cup;
And over every green morass,
Beyond the utmost lengths of grass,
Earth drinks the wonder up.

There is a glory in the world;
The morning is like wine,
And pale ascension lilies lean
Like gods who late in heaven have been
Half flowerlike, half divine.

O sweet revival of the grass!
O sweeter songs that rise,
When jocund April leads her train
Through the gold sunlight and the rain,
And earth is paradise.

(Reprinted)

An Old World Tree of Commerce

FIRMLY ROOTED IN THE NEW WORLD, THE CHINA WOOD OIL TREE HOLDS THE LURE OF GREAT POSSIBILITIES

By INEZ HALE MACDUFF

Cluster of tung oil flowers.

ON the brow of a sloping hill near Tallahassee, Florida, there stands a large tree with a smooth gray trunk and angular branches. It is enclosed within a small square by a rusty iron fence bearing a metal marker with an inscription. The ground around it is covered with fallen leaves, curving dried hulls of large round nuts, and withered husks of nut meats divided into symmetrical sections.

Scattered here and there over the pasture in which it stands and through its fringes of woodland are growing trees of the same type. A short distance to the south is an irregular hedge of them which some observer has planted, perhaps to express an inarticulate appreciation of beauty.

It is the Chinese tung oil tree, often known as the China wood oil tree, and its successful naturalization in the United States completes an important experiment begun by the United States Department of Agriculture a quarter of a century ago. The tree within the little enclosure is the first tung oil tree planted in Florida and is one of the first to grow to maturity on the North American continent. It was planted in 1906 by the late William H. Raynes, an enthusiastic amateur horticulturist, from seed furnished by the Department of Agriculture.

Near Tallahassee stands the oldest tung oil tree in Florida, leased to the United States Department of Agriculture for experimental purposes.

Tung oil, derived from the tung nut, has been a valuable commodity in China for more than five thousand years, but it was not introduced into the United States until 1869 and did not come into general industrial use until 1905. It is now the fourth largest chemical import which reaches the United States, over twelve million gallons, one hundred million pounds, being shipped to this country annually from the ports of Hankow, Shanghai and Hong-Kong.

The increasing difficulty of securing adequate and unadulterated supplies of the oil for use by American industry prompted governmental officials to initiate a series of experiments in the early part of the twentieth century in the hope that the tung oil tree might prove adaptable to conditions on the North American continent and be eventually grown on a commercial scale. There are now 8,000 acres of tung oil groves in the southeastern states, with hundreds of thou-

sands of young plants in nurseries, but commercial production of the oil is as yet confined to northern Florida. State authorities estimate that this acreage will have to be multiplied many times before the present requirements of American industry are fully met.

The tree was first planted in California, and shortly afterward it was introduced into Alabama, Georgia, Louisiana, Mississippi, North and South Carolina, Florida and Texas. Plants and seed were distributed for a number of years. These early experimental plots were highly valuable in demonstrating which sections of the United States were suited to the growing of the tung oil tree, but thus far Florida is the only State in which it has continued to grow and produce under conditions which warrant commercialization of the project. The Department of Agriculture advises its planting in a very narrow strip along the northern Gulf Coast and in the extreme southeastern and southern parts of Georgia, but as yet commercial production has been confined to the north central portion of Florida.

The beginning of a tung oil grove near Gainesville, to augment the 8,000 acres of young trees now growing in the southeastern states.

Of special interest is the observation that this particular area is on the same parallel as the region in which tung oil trees have been grown for thousands of years in China, with similar temperature, rainfall and general climatic conditions. Opinions differ as to the minimum temperature which the trees will stand, but those which mature and bear with success are not subjected to a temperature lower than twenty-five degrees above zero, and that infrequently. The age, health and environment of the plants are important factors in combating low temperatures.

American-grown tung oil at present comes from *Aleurites fordi*, which is the hardiest and most valuable species of the genus. It is native to the provinces lying adjacent to the Yangtze River in central and western China, and it grows extensively there under primitive methods of cultivation or without cultivation. *Aleurites montana*, growing in southeastern China, is less hardy and does not bear prolifically. However, it is thought by many to be more suited to the extreme southern portions of Florida than the *fordi*. *Aleurites trisperma* grows in the Philippine Islands, producing a limited amount of oil of secondary quality, and *Aleurites cordata*, which grows in Japan and Formosa, also produces an inferior oil in small quantities. *Aleurites moluccana* is widely scattered through the tropics under various names, but it has not been adapted to commercial use. The *fordi* produces more than ninety per cent of China's exported tung oil.

In the spring, terminal buds, which may be either fruit buds or leaf buds, are formed at the ends of the branches grown during the preceding season, and in early experiments it was found that these buds are affected favorably by the application of suitable fertilizer early in February. The Chinese trees are said to bear a single nut at the terminal, but the cluster type has been developed in this country, thus materially increasing the yield of each tree.

A young tung oil tree bearing fruit, which is about the size of a small apple, each nut containing from three to seven seeds.

The flowers are either staminate or pistillate —male or female—but both are found on one tree. Since only pistillate flowers develop into fruit, trees which regularly bear pistillate flowers in clusters are of course the most desirable for commercial use, and it has been demonstrated by experiments that seeds from such trees retain this cluster fruiting characteristic in more than ninety per cent of their plantings.

Following the flowers the foliage appears in clusters of large dark green leaves, each roughly heart-shaped, and from them the Chinese name of the tree, *tung-yu-shu*, is derived, *tung* meaning "heart." The tree is quite ornamental, as it grows to a height of twenty-five feet or more, with an equal spread. Its peculiar branching habit, however, large catalpa-like leaves and mass of early blossoms, give it a unique appearance.

The fruit averages about the size of a small apple, each nut containing from three to seven seeds, and it is a dark olive green, turning to dark brown as it matures. The seeds resemble

castor beans in appearance, and their meat is white and very oily. In the early autumn the nuts ripen and drop to the ground, where they sometimes burst open from the base upward and expose the seeds.

In China it is customary to knock the fruit from the trees before maturity, collect it and allow it to ferment until the husk can be easily removed. This is highly injurious to the quality of the pressed oil. The Chinese perform by hand all of the work of gathering the fruit, drying, hulling and cracking the nuts and pressing the oil from the seeds, using the crudest and most laborious methods. This renders the proportionate quantity of oil from a given crop small and the quality inferior. The Chinese oil varies so much in quality and is so frequently adulterated that no American manufacturer will acccept a tank for unloading until it has been thoroughly tested.

After experimenting with several methods, a scientific mechanical pressing plant was perfected and put in operation near Gainesville, Florida, in 1929. Here the complete unit of the plant, requiring the services of only a few men, performs the work that is done by hand in China by from 700 to 1,000 men. The American oil is not touched by human hands after the nuts enter the decortication machine. This new press reduces the oil content of the residue to about five per cent, as contrasted with twenty per cent the Chinese leave in the cake after operating their small wooden hand presses. The American oil is light-colored, neutral as to acid content, and has a much better chemical analysis than the imported product.

Fourteen-year-old tung oil trees on the grounds of the Florida State Agricultural College. The trees are planted too close together for satisfactory results.

During the first season of the plant's operation 100,000 pounds of tung nuts, yielding 20,000 pounds of American-grown oil, were handled. As yet most of the nuts produced have been used for planting purposes, but when full production of present tung tree acreage is reached it is believed that the American oil will bring a premium of from one to two cents a pound over the dark and frequently adulterated Chinese product. Under proper conditions the tung tree bears a fair crop of nuts the fourth year from seed, and marked increases in the amount of oil produced from American-grown nuts will be made within the next few years. American manufacturers have eagerly sought for experimental and comparative purposes all the oil thus far produced in this country. Plants will probably be established in small units consisting of one decortication machine and two expellers, the whole handling 3,000 pounds of nuts an hour. Such a unit requires from 2,500 to 3,000 acres of tung oil trees for its profitable operation.

The Chinese long ago discovered the valuable water-proofing and rapid-drying qualities of this oil, and by the exercise of ingenuity in adapting it to their needs they have been able to get along satisfactorily without rubber. They use it on all forms of wood structures and masonry, and apply it to their junks and other water-craft to render them water-proof. They also lacquer furniture and paint cloth, silk and paper with it. Tung oil forms the principal ingredient of a pasty substance which serves as a filler in all wood surfaces and has been used to calk the seams of boats for thousands of years. The early writings of Marco Polo frequently mention this use of the oil. It is also used by the Chinese in concrete, soap and medicine, and it forms a rather unsatisfactory fuel for lighting purposes.

In the United States tung oil has been principally used as a necessary ingredient of water-resistant paints, varnishes and enamels, and there is no known commodity that will take its place for this purpose. It is also used in the manufacture of insulating compounds for all kinds of electrical apparatus and wiring, water-proofing for raincoats, bath curtains and other water-resisting fabrics, automobile brake bands, gaskets and fittings for machinery, and many other commodities in every-day use. Eight hundred and fifty large manufacturing concerns use it in quantities, and one electric company alone utilizes nearly 1,500,000 pounds of tung oil each year.

Substantial investments in tung oil groves in Florida have been made by paint and varnish manufacturers who are gravely concerned over the uncertainty and inadequacy of the supplies imported from China, particularly under existing political conditions in that country. The British government is also giving intensive study to the possibility of producing tung oil in its colonies, and experiments are being conducted in a number of them.

Thus the small shipment of nuts from Chinese tung oil trees which was sent to the United States Department of Agriculture in 1905, by the United States consul-general at Hankow, promises to develop into an industry of world-wide importance.

One might ponder long on the extent this valuable chemical import from the ancient land of the Far East will be affected by the recent warlike gestures at Shanghai. This great city. now in ruins from shells and fire, is one of the chief ports of China, and millions of gallons of China wood oil are dispatched yearly to America and Europe. Too, the large valleys and great plains stretching from its waterfront root thousands upon thousands of tung oil trees. If the ruthless march of war continues in China the export of tung oil, as well as its source, the trees, will be seriously menaced. This is decidedly true should the war area engulf Hankow and Hong Kong.

But it places the experiment of the Department of Agriculture in a conspicuous position, and if growth is parallel to possibilities the old tung old tree near Tallahassee, enclosed by a small rusty fence, may become a monument to a new and rich American forest of commerce.

Forest Conservation as a Function of State Government

By HENRY SOLON GRAVES

Virgin timber in the New York State Forest Preserves, where a policy of public forests was inaugurated in advance of the establishment of the National Forests. The original law specified that the lands in the State Forest Preserves should be forever kept as wild forest lands.

ONE of the most significant developments in forestry has been the widening of the public activities in different states. Forty-five states now appropriate public funds for forestry work; and this does not include the activities in the Hawaiian Islands, Porto Rico and the Philippines. Thirty-nine states have a central agency or bureau charged with the promotion of the conservation of the forests within their borders. This list includes practically all of the states in which there are forests of importance, other than those administered by the Federal Government. The extent of the public activities in the different states varies widely. The smallest annual contribution is $581 and the largest more than $1,500,000. The fact of importance, however, is that forestry has officially been brought into the program of development of most of the states of the union.

Forestry is often spoken of as a public problem. By this is meant there are public benefits and services from forests different in character from those derived from other resources, and that the problems involved in achieving the purposes of forestry require for their solution the participation of the public in ways that are distinctive. There are vital public interests in the proper utilization of all natural resources. The public is benefitted if they are used wisely; it suffers if they are wasted. Throughout history the forests have contributed in manifold ways to the economic development of the country and to the comfort and convenience of the people. Vast quantities of timber have been available for building construction and for the fabrication of implements and articles used in industry and in our every day life. When one source of supply has been exhausted new bodies of material have been opened up to furnish the country's needs. Even today the central markets are supplied with wood products of high quality obtained from the so-called virgin forests. But the reserves of old timber readily accessible are fast being diminished and increasingly the country's need must be met from timber that followed the first cuttings.

The continuance of a supply of timber of good quality for industrial use is a public problem of first order. Predictions are frequently made of late that the use of wood will greatly decrease. Sometimes, I fear, this suggestion is used as an excuse for the failure of owners to employ the measures essential to secure a replacement of trees of good quality after lumbering. Present conditions of industrial depression and underconsumption of wood products should not blind the people to the necessity of making provision for the certain needs of those who will follow. Wood is an essential raw product, better for a great many purposes than any other materials. Science and invention yearly find new uses of wood that contribute to the national need. Fortunately the forests may be perpetuated, but materials of high quality and in abundance can be grown successfully only by the application of special effort and skill.

The production of raw materials for use is, however, only one of the services of the forest. There are certain general benefits which are derived from the very existence of well managed forests. I refer to the functions of protecting the soil on

the hills and mountain slopes, the influence of forests in regulating the runoff of water, and their utility for recreation and as a home of wild life. The nation is dealing not merely with a question of raw materials useful in industry and the arts, but with other broad services of the forest that touch human interests at many points. Experience is teaching the country the significance of these general values inherent in forests. The very consequences of forest destruction, felt more and more each decade, are emphasizing their vital importance. The washing of soils that never should have been cleared, the losses from torrents and floods, the irregularity of the streams and rivers used by local communities and industries, the impoverishment of extensive regions through the depletion of the forests, and the destruction of scenic and recreational features of high value, are bringing home to the nation that forests, well distributed and strategically located, are a public necessity.

It is often the general benefits of forests, rather than the need of maintaining the supply of wood products, that is most appealing to the average citizen as a reason for forest conservation. Wood has always been furnished in abundance. The possibility of embarrassing scarcity later on is given little thought, just as most persons are not concerned about the supply of coal, oil, iron, copper and other materials, no matter how dark the picture of future shortage may be painted by experts. A single flood that washes out bridges and roads, a forest fire that scars the countryside, a drought that dries up the springs and streams on denuded land, are far more convincing to the average person of the importance of forests than the destruction of millions of feet of timber in some remote section which he has never seen.

It frequently is the case that the chief support of the forestry movement in a given state or region comes from those who are more interested in the values and public service of the standing trees and forests than in the future supply of lumber. This is well illustrated in the State of New York which inaugurated a policy of public forests well in advance of establishment of the National Forests. The actuating motive of the majortiy of those who were responsible for that legislation in 1885 was to preserve the forest for its general public benefits. The original law specified that the lands constituting state forest preserves should forever be kept as wild forest lands. This policy was further strengthened by the constitutional amendment of 1894 which expressly prohibited the cutting of trees on the State lands in the forest preserve counties. The people believed that the forests in a wild state would be of greater benefit to them than if used for industrial purposes. Whatever may be said of the disadvantages of such a sweeping restriction on the New York Forest Preserve, the important fact remains that the forests are still there, serving in watershed protection and available for the recreational use that has been growing in volume by leaps and bounds in recent years. The forests on the cut-over lands which were acquired are growing, the open spaces have been replanted, and there will be a great forest reserve of timber if later on economic pressure forces its industrial use.

More recently the recreational objective of forest con-

In developing our wild forest lands, maintaining stream flow through the establishment of protection forests, and extending wilderness areas through public cooperation, great contribution is made. For the forests offer opportunities for fishing, hunting, camping, exploration and other types of recreation of immeasurable value.

servation has played an important role in other sections of the country. While it is difficult to measure the various factors that bring about the support of public forest activities in a given state, it is probable that the recent extraordinary interest in forestry in the Lake States has been in considerable part due to the activities of men primarily interested in recreation. Some states have been ready to contribute to forest parks when they are not ready to establish state forests. Witness the local support of the Great Smoky National Park, in North Carolina and Tennessee, and the Shenandoah National Park in Virginia, for the establishment of which the states have liberally contributed their share.

There have been times when the interest in forests for their natural attractions and recreation service has been regarded as sentimental. Perhaps some of the so-called sentimentalists and visionaries saw further than the economists. The preservation of the forest for its own sake is now assuming very large economic proportions. The outdoor recreation movement has created new values and greater services from forests. One often reads of the recreation industry of given states yielding annual returns of many millions of dollars, where the forest is the central feature of attraction.

The enumeration of the advantages of forests which I have indicated does not, however, fully explain the public necessity for the efforts which The American Forestry Association and other interests are making in forest conservation. One of the most important services of the forest is its contribution to the up-building and maintenance of the industrial structure of rural communities. These efforts have to do not merely with supplying lumber products to people living at points remote from the forests, or with conserving attractive recreation areas for city dwellers who reach them by train and automobile, or with the regulation of rivers to safeguard the interests of navigation and water power for general industry. They are concerned also with the welfare of the people in the communities near the forests which depend upon their resources for a livelihood. The various services of the forest which I have mentioned are of great value to all the people; the activities involved in making the forests available for use contribute to the support of local populations.

Accounts of towns and counties which have been impoverished and depopulated because of the exhaustion of the forest resource that has been the basis of their industrial existence are repeatedly brought before the American people. Vast areas of land are being forfeited to the counties and states because the owners can no longer hold them after stripping off the timber. In the Northeast a great number of farms, supported in part through local forest activities, have been abandoned. In the South the difficulties of building a population in many sections are enhanced because the forests which must contribute to community support have been or are being cut off.

New York State is embarking on a vast project, involving $20,000,000 or more of public money, of acquiring and reforesting lands formerly used for field and pasture. Many small public forests of five hundred acres or more in area will be established and the cleared lands replanted. What is the purpose of this public undertaking? It is not for timber alone. These scattered areas will have some bearing, I have no doubt, on water conservation. They will render some service in recreation and in conserving wild life. The service that interests me and which I believe must be the ultimate justification of the undertaking is the influence of these state enterprises on the nearby local communities. The very existence of a state establishment, with its public activities, instills new confidence and hope in a struggling community. The state in its own protection will see to it that the surrounding forests are well protected from fire. The influence of the forest officers will serve to bring about a more intelligent handling of forests in the vicinity. People will take pride in the local state forest and will contribute to the convenience of those visiting it through improved roads and hotel and other facilities, receiving rewards for their efforts. And ultimately when the forests on the state areas and surrounding private forests have reached the period of economic use, the direct service of the timber in aiding local industry will be a vital factor in community prosperity. When the perpetuation of the forest and the restoration of denuded lands are urged, it is with a mind to human benefits, the increase of rural population, the stabilization of local industry—agriculture as well as forest industry—and the sustaining of community prosperity, as well as the satisfying of the more general needs of the people of the states and of the nation.

The public is participating in one way or another in problems relating to the development of all natural resources. The most conspicuous illustration is the public activity in the promotion of the interests of agriculture. The problems of forestry also are such as to require the participation of the public in their solution, and in ways different from those which are applicable to other resources. This is due, first, to the fact that forests are exposed to injury or destruction by fire and by certain virulent insect and fungus pests; second, to the need of conserving forests for their general benefits, which will not be safeguarded without action by the public itself; and third, to the peculiar character of the problems of forest production arising out of the long period of time required for trees to reach a size suited to industrial use.

Experience has demonstrated that success in protection of forests from fire requires the coordinated efforts of both public and private agencies. Fire protection on private lands made no substantial headway in most sections of the country until there was organized in the several states a system of preventive work under the direction of the state forester or other authorized public agency. The most conspicuous achievement in state forestry has been the direction of the state-wide protective work. The national interests involved in forests have justified federal expenditures now aggregating about $1,500,000 a year in aid of this work. The contributions of the states amount to about $3,000,000 a year. Private owners furnish something over $1,222,000 for the cooperative protective work, in addition to what they may expend independently on their own properties. The public thus participates in the undertaking financially, it directs the general system of organized protection, and brings into effective correlation the various interests concerned. Without such public action the private owner is almost powerless to safeguard his property from fire. The forest fire has by no means been mastered. Some states have only just begun their system of protection. But the very fact that all of the states in the Union in which there are forests of importance can qualify for federal cooperation under the provisions of the Clarke-McNary Act is an element of great significance in forestry.

The lands needed for general public benefits are commonly classed as protection forests. They require a different type of management from that which can ordinarily be provided by private ownership. Strategically located forests are needed for watershed protection. It is the well managed forest which serves this function in the highest degree. The private forest upon which very extensive clearings may be made periodically and upon which intensive fire protection may not be feasible, will not in the long run meet the public needs. The maintenance of a capital stock of timber available for continued support of local industries will not be assured by private owners unless this is required by public action as is the case in Sweden and certain other European

countries. The broad public benefits centering around the recreation service of forests certainly will not be obtained from private owners who may at any time decide to exclude the public. Usually a single protection forest may serve most if not all the general public benefits above indicated. These facts constitute the first need for the establishment of public forest reservations and parks. These principles have already been recognized in this country as in other countries the world over. Private owners cannot be expected to expend effort and money merely to provide the special type of management essential to furnish the public benefits flowing from well handled protection forests.

The public ownership of forests represents a distinctive feature of the participation of the nation and states in the forest problem. It is now being discovered that there are many areas of forest land formerly owned by the public which should never have been distributed to private owners. A wise policy, initiated forty years ago, withheld from transfer to private hands the bulk of the forests remaining in the Public Domain. These areas form the foundation of the National Forest system. The endeavor now is to recapture by purchase or other means additional lands privately owned which should be controlled by the public. In the proposals to acquire more lands for public forests, through action of the government, the states, counties and towns, there is no thought that the forest problem is wholly to be solved by public ownership. The bulk of the forests of the country are owned now and will continue to be owned privately. Thus the country must look in the long run to private forests for the supply of most of the lumber and other raw products of the forest used in industry. The public forests will, in a measure, contribute to the supply of these materials. In fact it is probable that the timber of highest quality—that which requires many years to produce—will be derived in considerable part from public forests. The problem of forestry on private lands is in many ways a larger one than that on public lands. The public forest will safeguard certain special interests of the people as already described. They will also contribute in an important way to the advancement of forestry on private lands.

The Presidential Range, in the beautiful White Mountain National Forest in New Hampshire. Our great National Forest system exemplifies what can be done in the proper utilization of our natural resources, but the author points out the great responsibility, and the opportunity of the public and of the states in cooperating to achieve the purposes of forestry, in the light of the fact that the bulk of our forests are now and will continue to be privately owned.

The difficulties of private forestry arise in considerable measure from the length of time that is required for trees to reach utility dimensions. The natural tendency of private owners is to realize on all the standing timber in a short period and to expend the least possible amount of money and effort in renewing the forest and in caring for the land afterwards. Capital is not attracted under present conditions into the forestry enterprise, both on account of the

long rotation of timber crops and also on account of the uncertainties of taxation and the risks from fire, insects and diseases. Hence the public in order to reap the benefits of well handled forests is extending aid in various ways to private owners. Cooperative fire protection, distribution of cheap planting stock, assistance through scientific and economic research, field experiments, and advice regarding methods of applied forestry, are valuable features of public aid. Efforts to adopt systems of taxation to the special problem of forestry hold out promise for further encouragement to private owners. The public forest is an additional instrumentality in promoting forestry practice. It serves as a practical demonstration of applied field methods. The empirical results of trial and error show what can be done under different conditions, what it costs, and what returns may be expected. It constitutes a center of public cooperation in fire protection and in many cases in joint measures of marketing forest products. One may look to the time when the public forests such as those being built up by the states as well as the larger National Forests, will be pivotal points about which the general practice of forestry of all types of owners will be built up.

A special problem is presented by the large areas of land which have been stripped of their forests by cutting and fire. Here is a problem of land reclamation of large proportions. Private initiative cannot be counted upon to restore these lands to productiveness. The work must be done largely through public effort. This means the public acquisition of the lands and their rehabilitation by planting new forest stands on at least a portion of the areas. In some cases the establishment of demonstration forests will suffice. In other cases there remains no other recourse than for the public to take over extensive areas of land and restore the forest growth. It will devolve upon the states to do a considerable part of this reclamation work. In some cases the problem is entirely beyond the power of the individual states. Through its very magnitude the task becomes one that is both necessary and appropriate for the nation itself to handle. The work of this character by the Federal Government which has so far been undertaken has scarcely extended beyond the scope of demonstration forests. Some of the states are embarking on programs of reforestation of denuded land.

The question of reclamation by reforestation of devastated lands is being forced upon the states by the vast quantity of land which is reverting to the public through tax delinquency. In the Lake States there are some 18,000,000 acres now tax delinquent and a considerable part will in all probability be forfeited to the public. It is asserted that in one southern state about 7,000,000 acres are in the same condition. The forfeiture to the public of land of low productive value on which the forest has been destroyed is also reaching extensive proportions in other states. The states and counties are finding themselves with vast areas of land on their hands, with no policy relative to their disposition and without funds or administrative machinery to handle them. They face the question whether or not the land shall be used as public forests, to be restored to productiveness and administered in the permanent interest of the people.

There is increasing recognition throughout the country that the purposes of forestry will be accomplished only if the public plays a definite part, along lines that have been indicated here. There is less agreement as to the extent to which the public should go in its activities. The problem is comparatively new to the great mass of citizens. Full information is not yet available regarding the real contribution that the forests may be in the building up of specific states, how urgent the problem is, what the consequences of failure may be and what is really essential for the public to do. This may explain in part the reason for the slow progress in public forestry in certain states.

We believe that the public must contribute to the forestry undertaking on a much larger scale than at present. Fire protection is a case in point. We are learning how to protect forests from fire. Each year some additional funds are provided from public and from private sources. Each dollar spent counts in values saved. But in most states the funds available are not sufficient to secure the most effective results. The point is being reached in many sections where real security of property can be obtained by increased public appropriations, for additional construction work, it may be, or for more transportation equipment, or for a larger force of men, or for more nearly adequate emergency funds. It is always uneconomical to use poor machinery in order to save money, or to try to run a business on insufficient working capital. This is being done in fire protection.

Similarly most students of the forest problem are convinced that both the Federal Government and the states must greatly enlarge their programs of acquiring public forests and of other activities in forestry. All of this means, however, larger public appropriations. This in turn means the necessity to provide the funds through some means of taxation. This cold fact must be given consideration by the forestry advocate as well as by the legislatures. When greater spending is urged in forestry, it must be recalled that there are many other urgent calls such as penal, corrective, insane, and hospital institutions, public roads, education, and a multitude of other urgent projects that touch the welfare of the people. Probably all of them need more funds. There is a general impression that public expenditures are already running beyond the means of the people and there is a call to halt the rising tide of taxation.

I do not believe that demands for increased public support of forestry should be in blind disregard of other state and national budgetary needs. I do, however, urge with deep conviction that forestry be given full consideration as a part of the public budgets. I believe that in many cases this has not been done.

The state has the responsibility to safeguard the welfare of its citizens. No state can afford to permit natural resources, upon which its permanent basis of prosperity depends, to be dissipated needlessly and wastefully. Citizens may have to tax themselves for public activities in forestry. This is a good investment if it will protect taxable values and will create wealth that in various ways will contribute to the increase of general industrial prosperity.

The different states have their distinctive problems of forestry which they alone must solve. There are problems which clearly are the function of the Federal Government. In many cases the government and state may appropriately and effectively join hands in problems that are both national and local. It is important to recognize that the Federal Government should not be expected to take over the work which properly belongs to the state, nor should the states be expected to undertake public enterprises which are national in character, scope and purpose.

Now is the time for the nation and the states to recognize squarely and fully their responsibility in forestry, searching thoroughly for the facts, and upon these facts to build programs of development which can be carried out progressively as fast as sound public finance permits. Let this be the beginning of a new era in forestry, and let Americans have the courage to take a chance in providing future public benefits, without waiting until disasters demonstrate what might have been accomplished if only they had had the needed foresight and intelligence.

ROOTS

By
ERLE KAUFFMAN

Photography by E. Atget, the Berenice Abbott Collection.

"His branches shall be spread and his beauty shall be as the olive tree, and his smell as Lebanon." - - - Hosea.

A TREE of noble features is monumental in its greatness. It has accepted its place in the sun and anchored to the inflexible purpose of serving to the height and beauty of its destiny. In shaping the fortune of all creation it moulds environment that the lesser and weaker forces of life may keep pulsing. Yet unlike humanity, a tree's greatness is not shrouded in mystery, though too often it is unrecognized. A tree is great because it is rooted.

"For there is the hope of the tree . . . though the root thereof wax old in the earth . . . yet through the scent of water it will bud, and bring forth boughs."—Job.

No matter how great, how uplifting, how noble the tree, it is never so great, so uplifting, so noble as the roots that anchor and feed it. For roots are the real nobility, the silent and indefatigable princes of all life.

Few people see roots except through the tree, indeed if they see them then. Fewer still know the secret of their miracle. The late Dr. Ernest H. Wilson, for many years director of the Arnold Arboretum, at Boston, who lived closer to roots, perhaps, than any other man, said in his great volume, Aristocrats of the Trees:

"This is the age of publicity, an age of the slogan, 'it pays to advertise,' an age when everything is shouted from the housetops, and he who bawls the loudest receives the most attention. It is no age in which to hide a light under a bushel, for in the glamour of things seen and heard there is no place for silent, shy and retiring natures. In an age like this it is no wonder that roots, which are unseen things, are passed over in silence and suffer utter neglect. At least this would seem to be their position in the world of things. Books, extolling the beauty of leaf and flower, of bud and bark, innumerable there be, but none that I know of tell the virtues of roots. Even in botanical text books roots are dismissed in a few paragraphs after their structure and functions are cited."

But that is real nobility. That is what makes of roots the silent and indefatigable princes of life. If a man performs well he is apt to bow to applause before he performs well again; if his service contributes greatly and heroically to the welfare of mankind he

"Thus was he fair in his greatness, in the length of his branches, for his root was by great waters . . . and under his shadow dwelt all great nations." --- Ezekiel.

becomes an idol, a thing of worship. Even an animal must be fed sugar as a reward for cleverness. But roots, the genesis of all life, invite neither applause nor worship. All they ask is recognition of their function and service that they may be allowed to labor without hinderance.

Man can learn to take root from the tree. He can learn from witnessing the miracle of spring, the period of resurrection, when death gives way to life again. He will learn that roots are the genesis of inspiration, the matter of deed, the spring of security and new hope. He will learn that by taking root he might serve destiny to a far greater degree than destiny might serve him. And too, he will learn that unless he does take root he must soon become dead timber, a windfall, and that the roots of another will soon take his place.

Man can also learn from roots not to give undue attention to externals, to devote more thought to the things least obvious. "In the erection of a building, the foundation," said Dr. Wilson, "even to the greatest ignoramus in engineering, is of first importance. The foundation of any plant is its root system and unless this be well and truly founded the plant cannot persist. In the erection of a tower, a factory, or a hotel, which is to be, say a couple of hundred feet high, great care is taken that its foundations are sufficiently broad and deep to support the structure. Many a tree grows two hundred feet tall, so think of the foundation system necessary to hold it strong and erect

against the maddest gales and the wildest tempests Dame Nature can let loose. Watch a tree during a heavy wind storm and the enormous stress and strain on its root system is apparent. It is no small thing for a mass of tentacles to grip the earth in such a manner as to hold erect a tree trunk crowned with a broad, branching head weighing many tons against the impetuous rush of a sixty to a hundred mile gale. Talk of clinging for grim life, that must be the condition of roots often during any one season and, as if that in itself were not enough, be it remembered that to the roots fall the vital function of supplying the leaves and plant tissues with every drop of water with food salts in solution necessary to maintain them in living condition." Men stand in awe beneath the great sequoias and the redwoods of California as externals fill them with wonder. But think of the great roots,—the unseen, that anchor these monarchs and have kept them alive for thousands of years. Think of the many billions of gallons of water these roots have sent into the majestic trunks of these ancient plants, the oldest of all living things. Man in all his cleverness has never approached a monument of such everlasting endurance and life. Is there not a lesson here for men? Is it not obvious that greatness is being firmly rooted, that life is measured by the soundness and service of these roots?

The first function of roots, Dr. Wilson observed, is to anchor the tree firmly in the soil. The second function is to absorb from the surrounding medium water with food-salts in solution and carry them to the trunk where they pass upwards into the leaves, the chemical laboratories of the plant, where with energy derived from the sun's rays there is manufactured the food necessary for supporting and developing the life of the tree.

"And the remnant of the House of Judah shall yet again take root downward, and bear fruit upward."--- II. Kings.

"In the germination of any and every seed," he said, "the first organ to be pushed forth is the primary root, which turns towards the earth, penetrates and becomes the tap-root or roots, giving off rootlets which immediately absorb water to help in the development of the young stem and its first leaves."

Thus in nature every living thing must first root itself. Thereafter some are dwarfed by barren soil, just as mankind is dwarfed by barren ideas; others build their own soil by extending their roots, just as mankind holds its ideals by force of energy and clear thinking.

Roots are not always beautiful to the eye. In their effort to anchor the tree in position and to overcome and evade obstructions they often assume grotesque forms and shapes. They sprawl in every direction, gripping everything within reach with a fierce determination. Dr. Wilson wrote "their contortions are almost painful to observe but their tenacity of purpose is enviable."

The whole world today is speaking in terms of depression, of economic chaos, of social stagnation. The question immediately arises, how firmly is the world rooted? It had basked through the sunshine of spring and summer, of blossom and of plenty. Then came winter, the sunshine cooled, the blossoms fell, and the outlook is bleak and dead. Panic reigns in some quarters and the souls of many are oppressed.

They should look to the miracle of spring—and roots. For since the beginning of time life that is well rooted has survived the winters to blossom anew with the coming of spring. Roots are the silent and indefatigable princes of life.

"A man shall not be established by wickedness: but the root of the righteous shall not be moved." —Proverbs.

SPECKLED TROUT

By DONALD N. CARPENTER

TO the scientist *Salvelinus Fontinalis* is a fish, to the purist a native brook trout, but to the country boy he remains a speckled trout. To me, however, he is a gentleman of many pleasant and exciting memories. Although usually small in size, he is a thoroughbred from nose to tail. His gameness will be vouched for by those that have successfully lured him from his habitat, the fast water streams.

The speckled trout is a cannibal; he will eat his brothers, sisters, cousins, uncles and aunts, if he is hungry, and they are within reach. In addition to minnows his principal foods are bugs, flies and insects of all descriptions, worms, Helgramite, nymphs, caddis, crawfish, fisheggs, frogs and field mice on occasion. He also takes minute aquatic life that does not interest the angler as it cannot be duplicated by the artificial bait manufacturer. He seems to prefer solitude, particularly as his age and size increases.

The habits of the speckled trout are fairly uniform although there are always exceptions to the rule. He loves fast water and bubbling eddies. In front or back of rocks in a stream, under snags and banks, in the riffles, or at the foot of water-falls are always good places to look for him. In summer he seeks springs and the cool spots. In winter he is found in deep, quiet water.

In angling for speckled trout from the bank of a stream, it is well to keep out of sight, for he has good eyesight. Heavy tramping will always let the trout know you are near. Water is a wonderful medium for carrying sound waves. Talking, contrary to general belief, has no effect on trout. If you wish to have the best success wade the stream carefully. Your chances of approaching without detection are greatly improved. When angling with artificial baits always fish up stream. When using natural baits such as worms, salmon eggs, minnows, grasshoppers, or caddis larva always fish downstream.

When equipping yourself for trout fishing remember that the best rod is always light, strong, and with lots of backbone. The ideal reel is one that when filled with line and attached to the rod will create a perfect balance at the fly ring just in front of the hand grip. This is essential as one will carry a rod long distances, and make several thousand casts in a day. If your tackle does not balance, the wrist, which plays an important part in casting, will tire and you will lose lots of sport. A short rod should be used for bushy, overgrown streams, and a long one for open water. The line should never be too light for the rod. If anything it should lean toward extra weight, especially when there is heavy wind.

After netting the first fish of the day it is well to open its stomach and examine the contents. This will usually give you a clue as to what baits will be effective. If you are not fortunate enough to catch a fish or find that the lures you are using are unproductive, a few minutes of careful observation will give you an idea as to what flies are hatching or moving in the largest numbers. Most trout will follow the line of least resistance and rise to insects that happen to be the easiest obtainable. This does not apply to old trout with pronounced likes and dislikes. Do not forget that a large fish likes a large bait.

Occasionally a trout can be made to strike through anger. Well do I remember a day I was wading a fast mountain stream and came upon a large silent pool. In it I saw a big trout, not a record breaker but a good fish and a prize that would make any trout fisherman happy. I went into action with my dry flies and followed up with the wets. But I could

not interest him. I changed to spinners, so dear to the heart of a large trout, and still no rise. I then thought of a battered old metal wobbler I had in a pocket of my fishing jacket and attached it to my leader.

The first cast with the wobbler aroused interest. The big trout swam leisurely after the lure inspecting it closely. But there was no desire to strike and he returned to his position in the riffles at the foot of the big pool. My second cast aroused no interest at all. The next eight or ten casts produced the same results. But I continued to throw out my line having a hunch that the old wobbler would torment the fish. I was right. After minutes that seemed like hours I brought my lure directly toward the trout, giving with my wrist an added appeal to the irresistible action of the bait. That was too much for the beauty. Angered by this something that had encroached on his domain, he opened his big mouth and engulfed the lure. I instantly raised the tip of my light rod and set the hook in his jaw as hard as my leader and rod would stand.

Speckled trout favor fast waters and bubbling eddies, and they are especially at home at the foot of waterfalls. In the winter they seek deep water.

The fight was on. My adversary, a veteran of numerous encounters with members of the angling fraternity, recovered from his surprise and sudden pain and set in to show what he knew. A long run upstream at lightning speed took up a large portion of the line on my reel. However, by increasing the arch of my rod to the breaking point I stopped his rush with only a few yards of line to spare. Shaking his head, the trout lunged first to one side of the pool and then to the other in an attempt to snap the fragile leader. He failed at this and was off in a flash toward a rocky ledge, undoubtedly the scene of his escape from more than one angler. I discouraged this idea by pressure on the rod and finally turned him back toward me. If he had reached the ledge I would have retrieved only a broken leader for he would have sawed it in half on the sharp edges of rock.

The trout then sulked in the depths of the pool and I strained my rod in an effort to move him. I succeeded and he was off again in a wide circle, still showing lots of fight. I worked him in toward my landing net, inch by inch, but he broke and made another desperate rush, making my fly rod drag sing.

Again I brought him in and he appeared to be weakening. He fought in circles that grew smaller every second. Finally the old warrior lay on his side exhausted and I led him toward my net, finishing the battle. I decided he was more of an ornament to the stream than a frying pan so placed him back in the water. He deserved his freedom.

If the angler wishes success with the speckled beauties, he must wade the streams, the author maintains.

To get back to the matter of equipment, trout can be caught with the simplest kind of tackle. The country boy with a willow pole, a piece of string and a small hook covered with a worm frequently puts the well equipped angler to shame with his catch. I feel that consistent results, however, are the due of anyone who will really study his fish and their habits. Time, too, must be expended lavishly.

No fresh water fish has ever captured the imagination of the public as the speckled trout. Fish for him, and you will spend days rich in romance, health and adventure, and evenings of vibrant memories.

The Snow-Surveyor of The Sierras

By
SWIFT PAINE

The snow-surveyor at his instruments on the summit of Mt. Rose, in Nevada.

DR. J. E. CHURCH, JR., professor of Latin and Greek at the University of Nevada, surveys and samples mountain snow. Why? To determine the relation between snow and water supply for irrigation and power, and especially the relation between forests and conservation of this snow supply. He developed his accurate method of snow surveying as a hobby, but its development has almost crowded out his vocation. Short, perpetually brown, with mild eyes and a manner unfailingly benign, he is an utterly indefatigable mountaineer. When he went in midwinter on an expedition to Greenland, he maintained his meteorological observations on an ice-cap at three-hour intervals day and night. But that is another story.

He began his work in the Sierra Nevada Mountain near Reno, measuring great typical stretches of snow, particularly on the slopes of Mount Rose, northeast of Lake Tahoe. Many times each winter he measured the depth of these snow stretches at fixed points, a hundred feet apart. He developed a hollow steel cylinder with which he was able to obtain samples of the snow. These he carefully weighed to determine its density and water content. Over and over he did this, in dense forests, beside windbreaks of twisted Alpine white pines, on rough masses of broken rocks. People called him fussy, but he knew what he wanted. He wanted to know how much snow the mountains contain in any given winter.

Now his method is supported by the legislatures of Nevada and California, and by the producers of electric power on the Pacific coast. It has also been adopted in other places, notably in Utah and in Alberta, Canada. Each spring he and those using his method can accurately forecast how much water will be available in the rivers during the summer.

Last stages of pitted snow, as Dr. Church measured it. He found that a forested area conserved nine times as much snow as a deforested area.

In all of his snow surveying Dr. Church keeps a careful record, and his data on the conservation of snow by the forests are especially interesting.

Much timber in the region about Mount Rose was ruthlessly cut down about sixty-five years ago for the great silver mines of Virginia City and Gold Hill. On these semi-arid slopes the snow surveyor made some interesting discoveries. At an elevation of 5,500 feet he found that a reforested area thickly covered with young pines had in March of one year thirteen inches of snow. This he determined as equivalent to five inches of water. A deforested area dotted with manzanita and snow bush at the same altitude had five inches of snow, which would mean two inches of water. At the same

Weighing snow to determine its density and water content. Thirteen inches of snow in the forest is equivalent to five inches of water, Dr. Church found.

elevation a typical sagebrush area had only one and one-half inches of snow, which would mean only one-half inch of water. Thus the reforested area conserved more than twice as much snow and water as that which had been deforested, and nine times as much as that covered with sagebrush. His measurements in April at an elevation of from nine to ten thousand feet were just as striking. He also found that in the month of March a forested slope, though it gained little in actual depth of snow, kept its increase so packed down that the gain in water content was nearly fifty per cent greater than that on a slope without trees.

Dr. Church has made innumerable measurements of snow in different kinds of forests. An open forest of pine and cedar, he found, which had in January forty-seven inches of snow, had by the end of April only one-half inch. A dense fir forest had forty inches on the earlier date and two inches on the later. A fir forest, dense, but full of glades, had fifty inches on the earlier date and eight inches on the later. Thus glades greatly increase the snow-gathering capacity of a forest. In one sense, Dr. Church found that real dense forests are wasters of snow; but even they conserve far more than they waste in comparison with areas barren of forests. A sturdy growth of new trees can conserve almost as much snow as virgin forest without glades. The best types of trees for the conservation of snow, said Dr. Church, are those which are sufficiently separated to let the snow reach the ground and yet protect it from the sun and wind. A line of trees which form a break against the wind can conserve a good deal of snow that lies in the open, he found.

A man so gentle and yet so persistent as Dr. Church has naturally made enemies. What could a professor of Greek know about water? Seasoned ranchers and woodsmen laughed at him at first. To many others this busy man, taking such tremendous pains with his equipment, was a comic figure on the edge of the Great Basin. On the very top of Mount Rose he built a shelter tight as a ship's cabin and filled and surrounded it with an extraordinary collection of apparatus, much of which he later discarded. At one high windy mountain pass he put up a shelter like a sentry box to stand in while he recorded his data in books and on papers which otherwise might have blown away. It was a hard day's work to get that sentry box up to the 9,000-foot pass.

Gradually Dr. Church interested many in his snow-surveying—a rancher at a foot of a mountain, a caretaker at a summer resort on Lake Tahoe, a dam-keeper at the Blue Lakes. Bob Watson, one of the most famous guides in the Sierras, has become his staunch friend. In some he aroused enough enthusiasm so they would take measurements for him.

At first the money available for his work was pitifully small. He was forced to spend much of his own salary as professor of Greek. But every winter he is found dashing off to

Dr. Church surveying snow in Greenland in midwinter.

Mount Rose, Webber Lake, Ward Creek, Bridgeport, anywhere in the Sierras within a hundred miles of Reno. Botanists use his cabins in summer as centers from which to collect specimens. Geologists use them for the study of rocks. Always he is generous in sharing his experience.

Time after time I have gone to him for equipment and advice for pleasure excursions into the Sierras. With the utmost thoroughness he tells me everything necessary for me to know, gives me the keys to his huts, urges me to make free use of his provisions.

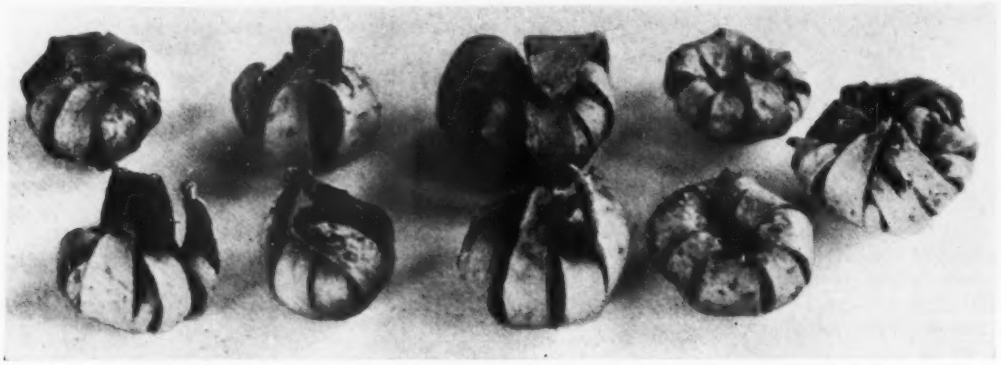
In the last few years, as a result of his Sierra Nevada success, he has been asked by the University of Michigan to go on two expeditions to Greenland. Naturally he has come back with more knowledge of winds and snow and ice than ever. Yet the region that is especially his is that around Lake Tahoe in both California and Nevada.

STARS THAT SHINE WHEN IT RAINS

By JAMES H. SEDGWICK

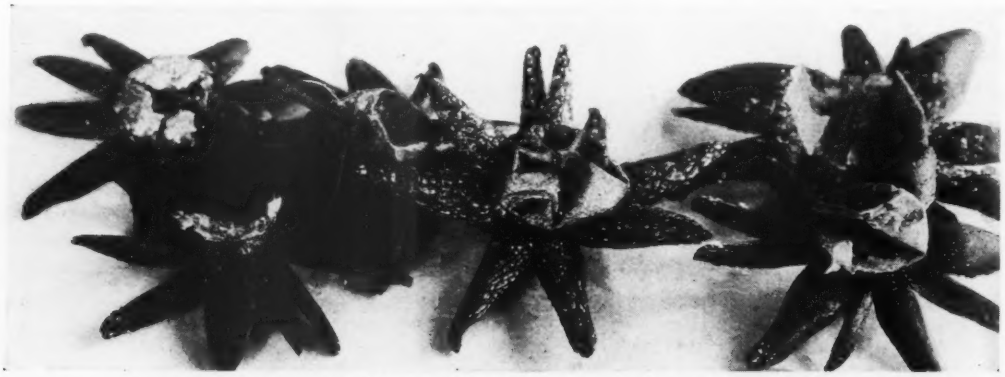
THERE is a curious little fungus, found in sandy woods, which entirely changes its form in accordance with the state of the weather. On fair, dry days the chances are that it will be overlooked by the hiker, for it will be tightly curled up into a small gray ball not more than an inch in diameter. When in this state it appears most uninteresting, like a small lump of clay or a bit of weather-beaten bark on the ground. It doesn't seem to be worth the effort it takes to stoop and pick it up. But immediately after a shower or early in the morning when everything is wet with dew, these gray bits of rif-raf expand into beautiful, dainty little stars, each with a round spore sack, like a tiny puff ball, attached to its center.

These interesting fungi are called Earth Stars. The particular species shown in the photographs is the Water Measuring Earth Star, or *Geaster hygrometricus*, said to be found in all parts of the world. In late summer or autumn it may be found bordering woods where the soil is very sandy or on sand knolls in the forest where herb and tree growth is sparse. It grows just below the surface of the ground until maturity.



Weatherbeaten, gray in color, averaging about an inch in diameter, these are the Earth Stars *(Geaster hygrometricus)* as they appear in dry weather. These specimens were sprinkled with water, and then —

The Earth Star's change in form is caused by a warping of the rays much the same as a board will warp when one side becomes wetter than the other. Each ray is composed of two layers, an outer and an inner one. The outer layer is tough and hard and does not soak up water readily, but the inner layer, being somewhat spongy, quickly soaks up moisture. This swelling of the inner layer causes the rays to uncurl and even to bend in the opposite direction, so that the dainty little Earth Star rests on the tips of its points.



Lo, the transformation! For this picture was made exactly ten minutes later. The little Earth Stars opened their rays with such speed that they could actually be seen to move. The largest had a spread of two and three-quarter inches. Their little spore sacks look much like tiny puff balls.

Rex Benedict

Indian Henry's Hunting Ground, in the Cascade Mountains—where the Alpine Lilies Grow.

Kidnapping Lilies of the Wild

By ANDERSON McCULLY

I AM torn between two loves as I write of lilies — their mountain loveliness, and their garden beauty. In the hushed stillness of the wooded mountain glades they sway gently back and forth, the personification of elfin grace and color and fragrance. Coming upon them suddenly after the labored climb up a steep mountain slope, one would instinctively drink in the delicious fragrance were it not that their fairy visions in the still coolness makes one loath to miss even a second of their grace.

Down in the gardens they profit by their easier existence, growing tall, and flowering with increasing freedom. But always there is the tang of the wild in their blood. They are untamable. They advance and retreat in a shy airy grace, giving all of their beauty and fragrance with that lavish hand that knows no withholding.

In bringing these Pacific lilies to the garden, there is one great point to be remembered — they must have drainage. While very many of them stand with feet in the water and head in the sun, it is the roots, and not the bulb, that rest in water. I always see that a little sharp sand comes in direct contact with the bulb upon all sides.

The beautiful *Lilium washingtonianum*, sometimes called the Nevada Lily.

Lilies group themselves naturally into two rather distinct cultural sections. In one may be classed the *humboldti, washingtonianum,* and closely allied species. In the other, the *pardalinum, parryi,* and so-called bog lilies. Those of the first section are found on cool mountain slopes, in forests, or at least protected by shrubs. The soil is always deep and perfectly drained, though its base is clay or rich loam. Mixed with this will be found crushed rocks and considerable leaf soil. Knowing all this, it is easily understood that a loose gravelly soil heavily enriched with leafmold, or a fairly good loam mixed with humus and sand, will be much to their liking.

Keep the surface moist during the growing season; but later when they finish blooming, con-

ditions should be drier. Protect them from cold or strong winds, and do not allow direct sun to dry out the ground. Rhododendrons, bamboos, tall perennials, or the partial shade of trees all furnish suitable protection.

The thimble lily, *Lilium bolanderi*, known also as the Oregon Lily.

The so-called bog lilies are found along the banks of the little streamlets in deep alpine meadows, on the borders of lakes and ponds, and in bogs, either raised upon hummocks, or bordering upon the edges. The soil is sometimes peat or pure humus, but it is always rich in decayed leaves and usually mixed with sand. The surface is protected by tall plants and low shrubs.

The bulbs of these lilies are not so deep, and they are more dependent upon surface moisture. But this does not mean that they like a water soaked soil. Use a light sandy loam with a heavy proportion of peat or leafmold. The fern corner with the constant drip from a fawcett, and drainage, might do for a few provided sun light reached them at least part of the day. Along the pool margins be sure to set the bulbs above the water level.

Of all the western lilies, *Lilium pardalinum* seems to have received the most notice from the garden maker. The descriptions of this lily vary startlingly; but this is not surprising when it is found growing from California to British Columbia in its various forms. Also, remember that it is one of the few lilies that lends itself to the hybridizer's skill. It is found in greatest variety in California, and locally has several names, panther lily and leopard lily being the most common. This is one of the bog lilies, and in the Sierras attains a height of from three to six feet. The flower cluster ranges from six to thirty blooms, usually pale orange outside, deeper within, and spotted with maroon. It is often blotched with orange yellow in the throat, and tipped with scarlet. The anthers are purple, changing to reddish brown, and the pistil is a bright green.

In cultivation *Lilium pardalinum* sometimes reaches nine feet, is stately, hardy, robust, and a splendid addition to the garden. Its first season is always disappointing as it resents disturbance, as well as lime. It is base rooting and should be covered with but four or five inches of soil.

Of its varieties, the hybrid Red Giant is a fine red and crimson form. *Lilium pardalinum roezli* is more slender and should be massed. *Lilium parviflorum* (*L. pardalinum minor*) is the form from the Mount Shasta district. It is a particularly fragrant lily.

One of the most beautiful of the yellow lilies is *Lilium parryi*, the lemon lily of the higher mountains of Southern California and Arizona. It is found both in moist shady spots in cool canyons, and in high alpine meadows. This lily is a pale citron hue, shaded with light brown on the inner bases. Conspicuous brown anthers add much to its beauty. Its pendulous blooms are funnel like, and have a delicate fragrance that somewhat resembles *Lilium auratum*, but is less heavy. The lemon lily blooms in June and July.

Lilium parryi blooms readily in gardens and seems to grow easily, but has a tendency to lack strength. Moisture, drainage, partial shade, peat or leafmold, and an absence of lime are its requirements. Cover the somewhat rhizomatous bulb with four or five inches of soil.

These are the best of the large flowering bog lilies. There is also a group of smaller flowered ones that demand similar garden conditions, but seems a little more difficult to cultivate. *Lilium maritimum*, the coast lily, carries bell shaped blooms in considerable profusion. They are deep crimson in color, and are lightly dotted in the throat. *Lilium parvum* is a subalpine orange with crimson tips. The bell shaped blooms are many, coming in June and July. There is also a clear yellow variety, *Lilium Parvum luteum*. These smaller flowered ones are sometimes used in peaty pockets in the rock garden.

Lilium washingtonianum is one of the two important types of the other group of lilies, and has several native varieties. Through the Siskiyou and Cascade Mountains its striking purpureum variety is found. The type is sometimes called the Nevada lily. The smooth, stout purplish stem is from two to five feet high, with successive whorls of dark green leaves its entire length, that glisten with a varnish-like sheen. The flower head is made up of from two to twenty blooms that outshine the Easter lilies themselves. Gradually the color changes through pink to wine. Growing so, in its habitat, each bloom is from three to four inches long and as much across. The petals are cleft to the base, and spread wide apart when the flower opens. The prominent anthers are yellow. There is an added whiff of spicy carnation in the delicious fragrance, and it is most truly a worthwhile lily in the garden. In cultivation, the individual flowers are nearly double the wilderness size.

The Washington lily has one variety, *rubescens*, that is called the ruby or chaparral lily. It is smaller, more compact, and a little less difficult to cultivate than the type. The buds and young flowers are white, dotted with purple on the inside. Gradually the blooms turn to pink, then ruby-purple. The cluster has the effect of being white at the top, and shading through pink to crimson and ruby at the base. To come upon a group of these lilies in the alpine woodland is worth an arduous climb up steep mountain sides. There is the hushed stillness of the alpine forest, and not far distant, the rollicking trickle of a rippling brooklet, while the brilliant nodding flower heads waft delicious fragrance through the air. There is also a variety minor.

The Washington lily, being of the mountain woods, likes partial shade. It requires a deep soil of peat or leafmold, and gritty loam well mixed with gravel, with perpetual moisture at the roots. Do not rot the bulb itself with this. Plant rather deep, six to eight inches. Some growers recommend a depth of twelve inches. This lily endures lime, does well on the Atlantic Coast, if properly placed, and tends to hold its bloom well through June and July. Five inches is enough covering for this variety *rubescens*.

Lilium kelloggi is a smaller, drooping, pinkish-purple lily that somewhat resembles the Washington lily. It has maroon spots, greatly reflexed petals, much fragrance, but also more tenderness than the other lilies of this coast.

This western lily, *Lilium pardalinum*, is found from California to British Columbia.

The beautiful humboldt lily, *Lilium humboldti*, is one of the most beautiful of the western mountains.

Lilium humboldti, typical of the other group of mountain forest lilies, resembles *Lilium superbum*, but is even showier. It is reddish yellow or orange, spotted with maroon. The petals are reflexed, and the flowers are carried in a loose triangular cluster, blooming in June and July. The stout stems reach a height of from four to ten feet. The humboldt lilies will tolerate a heavier soil than many, and flourish in the adobe soils of California. They do, however, well repay the garden maker for the addition of leafmold or peaty loam. They do not resent lime, and do much better the first year planted than do most lilies. They are good among the shrubbery, or in the woodlot. Cover the bulb about five inches.

The variety *Lilium humboldti magnificum* is a freer bloomer with larger spots. It is from southern California and is also called the larger humboldt. It is an improvement upon the type. For the rock garden, use the *puberulum* form. It is the hairy humboldt lily, a smaller growing one in every way. Catalogues list this as *bloomerianum*. *Lilium columbianum* is like a smaller and daintier humboldt. It is golden yellow spotted brown, and blooms in June. Cover six inches, and plant in groups or masses, or in the rock garden.

The coast lily, *Lilium maritimum*, has bell shaped blooms.

Splendid to follow *Lilium columbianum* in July and August is *Lilium bolanderi*, the thimble lily, but known on the Pacific Coast as the Oregon lily. Grouped among the small shrubberies in the rockwork, this is one of the best of the true lilies for the rock garden, as its height ranges only from one to three feet, and the form and color are both interesting. The blooms are bell shaped, deep crimson, spotted with purple, and are a pleasing contrast to *Lilium columbianum*, though this lily will not tolerate the lime that *columbianum* accepts.

So slowly do lilies relinquish their wild nature, the hybridizer has had little success with them. Luther Burbank worked long and patiently and gave America two as the result of mingling the best native species. One bears his name simply as *Lilium burbanki*. The other is *Lilium burbanki selected*. They are both worthy a place in the garden. The selected is a free flowering, recurved petaled hybrid of *pardalinum x humboldti*. *Lilium burbanki* is an offspring of *pardalinum x washingtonianum x parryi*. It is orange spotted with brown, and flushed crimson on the tips. From twenty to thirty blooms are carried loosely (*Continuing on page* 253)

FORESTRY IN CONGRESS

By G. H. COLLINGWOOD

WITH the passage of the Agricultural Appropriation Bill, H. R. 7912, by the Senate on March 8, there was restored for the work of the Forest Service $204,940, which had been pared from the Bureau of the Budget estimates by the House. This includes $9,000 for maintaining a forester among the agricultural observers in Europe, and $45,940 for the acquisition of additional forest lands in the East, thus restoring the item to $245,940. Administration of the National Forests was increased by $76,500 to make a total of $7,169,494. Planting on National Forests was brought from $154,200 to $160,000.

The appropriation for protection improvements on National Forests was increased by $52,400 to a total of $1,045,840 and the Senate struck out the clause requiring that $500,000 be available for constructing and maintaining roads and trails to be built during the fire hazard season. Without restricting the road program this gives greater freedom for the forest officers. Senator E. P. Costigan, of Colorado, secured the passage of $5,300 with which to continue the silvicultural work of the Rocky Mountain Forest Experiment Station. That was done in the midst of a drive directed by Senator Kenneth McKellar, of Tennessee, to reduce appropriations to every bureau in the Department of Agriculture. The McKellar amendment to abandon forest research was not passed, but he succeeded in reducing the fund for the control of white pine blister rust from $469,997 to $400,000, and those for the control of brown tail and gypsy moths from $577,880 to $400,000.

No doubt the efforts of The American Forestry Association and its members helped materially in restoring the Forest Service funds and in holding them against loss on the floor of the Senate. The public hearings before the Senate Sub-Committee on Agriculture of last January have been followed by letters, telegrams, and personal visits to nearly every member of the two Houses.

The bill now goes to conference where these and other items will be the subject of discussion. Members of the conference committee include Senators Charles L. McNary, of Oregon; Wesley L. Jones, of Washington; Henry W. Keyes, of New Hampshire; William J. Harris, of Georgia, and John B. Kendrick, of Wyoming — Representatives James P. Buchanan, of Texas; John N. Sandlin, of Louisiana; Michael J. Hart, of Michigan; John W. Summers, of Washington, and Robert G. Simmons, of Nebraska.

The House clause limiting the cost of motor vehicles to be used by employees of the Department to $750 was rejected, as were the House provisions forbidding salary increases or the filling of vacancies during the next fiscal year.

Following the passage on February 16 of the Appropriation Bill for the Department of the Interior, H. R. 8397, Secretary Ray Lyman Wilbur wrote the senators of the western states and urged the restoration of items totaling $4,583,500. No doubt this helped influence the Senate Sub-Committee on Interior Department Appropriations, under Senator Reed Smoot, of Utah, to restore $1,000,000 for roads and trails in National Parks and $3,000 for improvements on the Platt National Park, in Oklahoma. In his letter to the senators, Secretary Wilbur explained that "economy that brings disorder into well regulated and necessary organizations is misdirected and can only prove expensive in the long run."

After the manner of Senator McNary's Sub-Committee handling the Agricultural Appropriation Bill, Senator Smoot's Sub-Committee struck from the bill the House provisions limiting the cost of department owned automobiles to $750, and restricting salary increases or the filling of vacancies during the coming fiscal year.

Hearings before the two committees on Public Lands to consider the report of the President's Committee on the Administration of the Public Domain, and adequate legislation for carrying out their recommendations, began before Senator Nye and his committee on March 15. In order to conserve time and travel expense of witnesses from the West, Representative Evans, Chairman of the House Committee on Public Lands, started hearings before his committee a few days later. The American Forestry Association presented a statement in accordance with the resolution, printed in the March issue of this magazine, passed by the Board of Directors at its quarterly meeting on February 18.

The President's message to Congress favoring reorganization in the government departments was followed almost immediately by vigorous action on the part of the House. A resolution, H. Res. 151, introduced by Representative Douglas, of Arizona, authorizing the Speaker to appoint a committee of seven to study reorganization of the federal departments and report by April 15, was agreed to on February 23. On February 24, Speaker Garner announced the following committee: Representatives Joseph W. Byrns, of Tennessee; John J. Cochran, of Missouri; John McDuffie, of Alabama; Lewis W. Douglas, of Arizona; William R. Wood, of Indiana; William Williamson, of South Dakota, and C. William Ramseyer, of Iowa.

On the same day, President Hoover announced that he was delighted that Congress was earnestly taking up the reorganization of the federal machinery and added that he would be entirely happy if his repeated messages to that body on the subject of reorganization should result in effective action. "It is a most unpleasant task to abolish boards and bureaus and to consolidate others, and at the same time it is a difficult job to do it wisely," said the President. "Congress has attempted repeatedly in the last twenty-five years to effect reorganization and has always abandoned the efforts under a multitude of oppositions. My suggestion for the past five years has been that the responsibility should be lodged with the Executive with the right of Congress to review the actions taken."

Passage of the Douglas resolution did not stop hearings on the Cochran and Williamson bills, H. R. 6670, and H. R. 6665, for the creation of an administration of public works and for the inclusion therein of the Forest Service and the National Park Service.

On March 3, Secretary Arthur M. Hyde, of the Department of Agriculture, appeared before the committee and expressed approval of the principles of a centralized administration of public works, such as might include the Bureau of Public Roads, but he protested against taking the responsibility for constructing forest roads and trails from the Department because they must be planned and built as a part of the administration of the forests. Furthermore, he stated without equivocation that the work of the Forest Service is primarily agricultural in nature and should remain in the Department of Agriculture. (*Continuing on page* 252)

A DUCK CENSUS FROM THE AIR

Biological Survey Makes Unique Experiment with Airplane

By JAMES NEVIN MILLER

SWOOPING low, or circling high over a rural district along the historic Potomac River, the queer maneuvers of a huge cabin airplane caused no little commotion among the inhabitants in the neighborhood of Fort Washington, twelve miles south of the City of Washington.

For fully two hours the plane performed a series of maneuvers never before seen in that section. For perhaps fifteen minutes at a stretch it would maintain a position 300 feet above a flock of ducks placidly feeding on a bed of wild celery. Whereupon, suddenly the plane would soar skyward until it reached altitudes of 500 and 1,500 feet, respectively, maintaining these positions for additional fifteen minute intervals. What on earth, the villagers wanted to know, could these airmen be up to? Not acrobatics, for there had not been a single spin or roll. Not bombing practice, for not a single bomb had come hurtling down out of the heavens.

Some bright villager conceived the notion that perhaps the flyers were on a hunting trip, seeking a good opportunity to shoot ducks from the plane, for always the airship maintained a position above the birds. Nor was this guess so far from the truth. A hunting expedition this was, but cameras and not guns were doing the shooting.

For this was Uncle Sam's very first aerial "duck census." Inside the Army Air Corps' plane were Frederick C. Lincoln, of the United States Biological Survey; Lieutenant David W. Goodrich, Army Air Corps' pilot, and Sergeant Andrew W. Matos, Air Corps' photographer of Bolling Field at Washington. Just what an aerial duck census means and how and why it was made, are perhaps best explained by Mr. Lincoln, nationally known authority on game birds and in charge of the unique flight.

"That an accurate government census of the number of ducks throughout the country is needed," he said, "is illustrated by the fact that ducks are disappearing rapidly in the United States, causing general alarm among sportsmen and conservationists. Serious drought conditions in the feeding grounds in the spring and early summer during the past two years have accentuated this condition.

"Not so long ago Paul G. Redington, chief of the Biological Survey, conceived the novel idea that aerial photographs of birds would be a valuable aid in studying flock formations and in determining their numbers. It had long been agreed that a quicker and more accurate check-up was needed than the old method of having an expert stationed on the ground, cast a practised eye on a given flock of ducks feeding on a body of water, and estimate, in round numbers, their total.

Ready for the first aerial duck census. Staff Sergeant Andrew Matos, photographer; F. C. Lincoln, ornithologist, and Lieutenant David Goodrich, Army Air Corps pilot.

"However, the idea wasn't carried out until February. Very obligingly the Army Air Corps volunteered the loan of an expert pilot and photographer along with a first class camera and a cabin plane. First of all we mapped out a preliminary course of action. We would take pictures at altitudes of 300, 500 and 1,500 feet. The pictures made at the lower altitudes would, of course, give us a close-up of the birds, while those taken higher up would cover a wider range of territory and prove valuable, we hoped, in making composite maps.

"Everything proceeded smoothly, according to plan. We took off on the morning of a clear, sunny day from Bolling Field, and headed down the Potomac River where we knew quite a few ducks had been seen. After circling about the region we located a flock, mostly canvas-backs and black ducks, feeding on a bed of wild celery.

"The flock numbered about the size I had reckoned would be satisfactory for our test, so I signalled the pilot to swoop low to a point about 300 feet above the ducks and maintain that position for about fifteen minutes. Meanwhile Sergeant Matos, an expert in the art of aerial photography, prepared

his cameras for action. One was especially equipped to take oblique shots and the other to take verticals. We were more interested in the latter and took more of them because they're the kind used to make composite, or mosaic, maps. However, during that busy morning we mapped a few obliques, though a majority of the forty photo groups were verticals.

"Talk about your queer ducks! These were sophisticated birds, sure enough. Certainly you would call them 'airplane conscious' because they weren't in the least flustered, no matter how close we approached, they continued to bask calmly upon the gleaming waters of the Potomac just as if our plane wasn't there at all, with its terrific noise of whirling propeller blades. For about two hours we circled about, Sergeant Matos taking photos at the additional altitudes of 500 and 1,500 feet.

"From every point of view our flight may be called a success. As a scientific achievement, however, it is a little early right now to make a judgment. After all it was planned as an experiment, nothing more. But the flight does open up interesting possibilities. For instance, just how will we utilize our composite, or mosaic maps, to make our duck census? Each photograph taken in the same chronology in the same location, whether at heights of 300, 500, or 1,500 feet, respectively, will be matched up so as to give us a complete composite view of the flock of ducks.

"Whereupon I will simply count every bird in the picture and discover how close my original guess of between 3,500 and 4,000 birds is in the matter of numerical accuracy. In other words, there is a pretty fair possibility that regular series of duck counts by the aerial photographic method may prove valuable as a reliable check-up on the method now universally utilized from the ground.

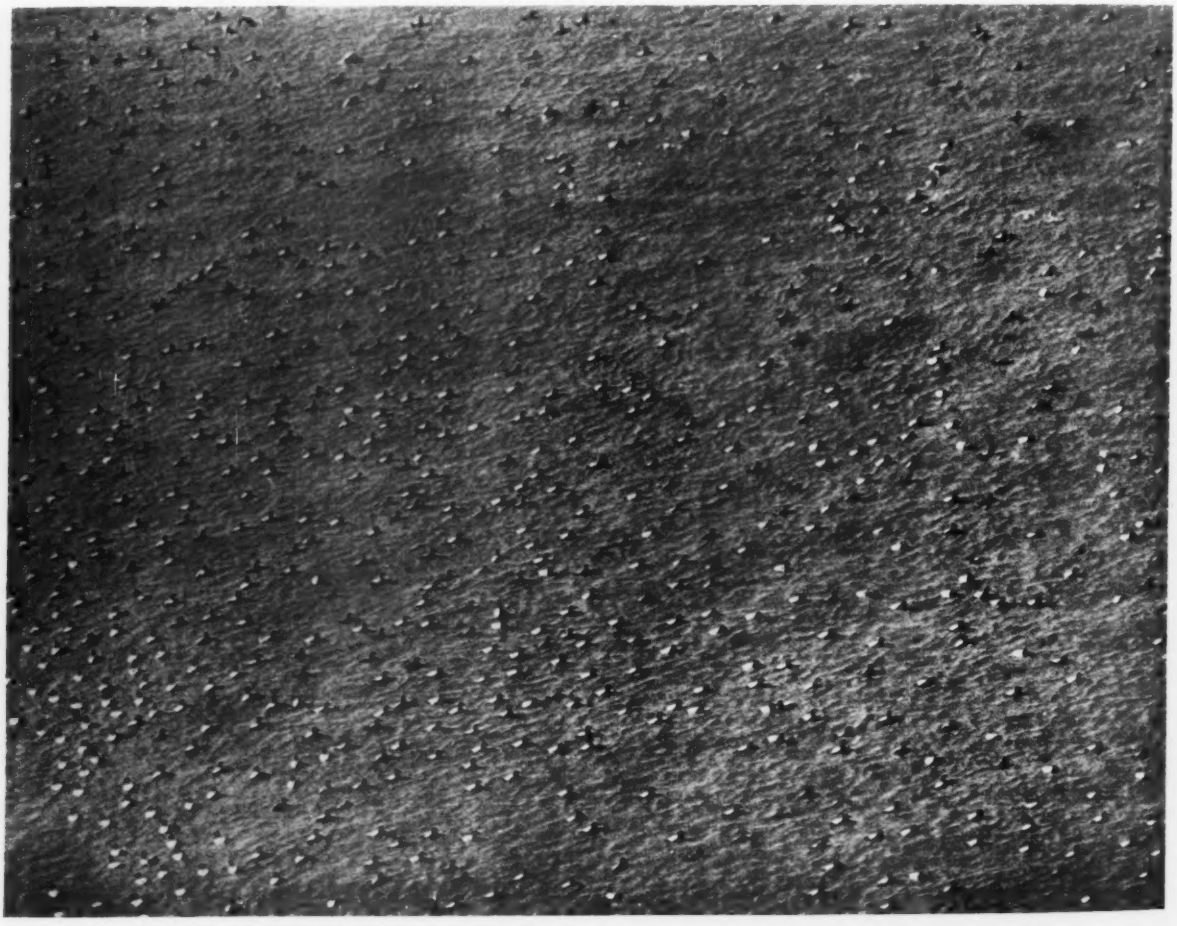
"One just criticism of the aerial survey method, however, lies in the difficulty—as we discovered in our test flight—of identifying accurately the various kinds of birds seen from the air and later shown in the photographs. This situation can perhaps be remedied by having census takers work on the ground while the areial survey is being made in the same locality."

Mr. Lincoln was asked whether he approves of the new sport of hunting ducks in airplanes.

"Federal laws make it unlawful to hunt migratory game birds from an airplane," he replied, "and a fine for violations is provided of not more than $500 or imprisonment for not more than six months, or both. Aviators, however, violate this provision from time to time, some in ignorance of the law and some in disregard of it."

How fast can ducks fly?

Statistics complied by the Biological Survey, show that ducks and geese ordinarily do not travel over forty miles an hour, though they are capable of slightly increasing this speed if frightened. They cannot, however, maintain the higher speed for a long time. The fastest pintails chased by an airplane in California recently flew fifty-five to sixty-five miles an hour, and a canvasback made seventy-two miles an hour. However, a flock of mallards at top speed in California flew only forty-three miles an hour.



How the aerial camera recorded the number of ducks feeding on wild celery on the historic Potomac River.

EDITORIALS

Watershed Ignorance

IT is a sad commentary upon American statesmanship that so little appreciation has been shown of watershed influences in relation to the conservation and control of our most vital natural resource—water. Our congresses and legislatures appropriate millions of dollars to build dams to control the next flood after damage has been done, lives lost and whole sections made homeless; to construct reservoirs and catchment basins to garner water during periods of drought; or to dig huge canals when a metropolitan area outgrows its water supply. But try to interest them in conserving and controlling water at its flowage source and they turn upon the proposal a glassy eye of incomprehension or skepticism. Theirs seems to be the complacency that boasts that Americans can build the highest dams, the largest reservoirs, the best levees of any nation in the world. And by that token apparently our water problems are solved for all time to come.

But our rivers continue to come down in devastating floods, reservoirs continue to silt up and dry up, water tables sink lower and lower and droughts follow floods with increasing severity. More lives are lost, more people are made homeless, more money is appropriated for relief and reconstruction and more taxes imposed upon those who can pay. That, in brief, is America's statecraft in water conservation.

It should be enlightening to most American statesmen to study water management in some of the older nations of the world where conditions of soil, cover, climate and topography are not greatly dissimilar to those in this country. We commend to their reading, the article "The Partnership of Wood and Water," which appears on page 197 of this issue of AMERICAN FORESTS and which is written by Dr. Hans Burger of the Swiss Forest Research Institute. Dr. Burger speaks from facts gathered through thirty years' intensive study of Swiss watersheds with particular reference to the influence of plant and tree cover upon run-off, floods. erosion and water conservation in general. Knowledge of the behavior of water as influenced by conditions at the headwaters of streams, on mountain sides, on forested and unforested slopes has become so well understood by the Swiss people that by popular vote they have ordained that the wooded areas of Switzerland shall never be diminished. To the far sighted statesmen who made it possible for the facts to be established, the Swiss people must feel deep gratitude because those facts are helping them to save millions of dollars in controlling their streams and in conserving their water and soil resources.

This watershed consciousness is in striking contrast to the situation in our own country. Our knowledge is pretty narrowly limited to the behavior of water in the main streams where the floods impact and our soils go merrily down to the sea at the rate of millions of tons a year. We know or think we know how by engineering formulas to control the floods after they have started but how to stop the floods from starting or how to lessen them by applying the laws of nature we know nothing in the generally accepted sense. The whole subject is stalemated by differences of opinion and by the absence of research knowledge. American foresters hold, for example, that forests and other vegetative cover exert in this country just as they do in other countries an important influence upon surface run-off, streamflow, flood conditions, soil erosion, air humidity and soil storage of water. These views are not generally accepted. By some they are flatly denied and by the rank and file of statesmen they are apparently set down as impractical theories not worth the cost of investigation. The result is that, ignorant of the facts, we continue to ignore our watersheds and content ourselves with spending vast sums trying to alleviate the shocks of nature's vengeance.

What America needs is a few statesmen whose vision encompasses the water problem of the United States in its full significance. From the standpoint of floods, it is a staggering problem. From the standpoint of soil erosion it is equally staggering although less spectacular. From the standpoint of assuring one hundred and thirty to one hundred and fifty million people, half of whom live in cities, with a permanent, steady supply of usable water, we predict that before many years have passed it will emerge as the greatest political issue of the twentieth century. All these questions head up in our watersheds and so long as we remain ignorant of watershed influences we shall remain unprepared to meet the ever increasing problems of flood control, soil erosion and future water supply.

—Stanley Shiner

"IN THE WOODS"

THROUGH THE LENS

"AT EVENTIDE" —A. D. Harvey

A Prize Outdoor Picture Contest for Amateurs

IN January, 1931, *American Forests* inaugurated "Through the Lens," a monthly feature designed to aid the amateur photographer in making better outdoor pictures and at the same time to stimulate photography as an outdoor sport. Fifteen articles have already appeared, bringing to the novice valuable information from such experts as Fred H. Kiser, Vivian Akers and C. O. Buckingham, and other articles will be published monthly through 1932. Have these helpful lessons benefited the amateur? Are more and better pictures being made of the outdoors? *American Forests* wants to know, and is inviting amateurs to submit their best subjects in a monthly prize picture contest. Each month, beginning in April and ending in October, *American Forests* will pay $5 for the best outdoor photograph submitted by an amateur photographer—amateur being interpreted in the sense that the contestant is not engaged in commercial photography. In addition to the monthly award all amateurs whose photographs receive honorable mention will be given a prize of $1 for each picture. The contest is open to any resident of the United States.

Awards will be made with the publication of the winning picture in *American Forests*, two months after the month of contest. That is, the prize picture of the April contest will be published in the June issue of *American Forests*, and the award made June 1. Unless otherwise specified, each picture will be entered in the contest of the month in which it is received.

Any outdoor subject will be considered—trees, forests, tree planting, lumbering, animals, birds, wild flowers, fishing, hunting, dogs, camping, hiking, mountains, and scenics of any nature. A contestant may enter as many pictures as he or she desires. Awards will be based on the combined effectiveness of photography and subject and the decisions of the judges will be final.

Contestants may use any kind of camera and the photograph may be any size, but glossy prints should be submitted when possible. However, this will not be taken into consideration in selecting the winning pictures. Contestants should not submit negatives.

The two photographs—one at the top of this page and the full page picture opposite—were made by amateurs and were prize-winners in the contest conducted by The American Forestry Association in 1930. Contestants should study these well. Also, before submitting photographs, read the rules which appear in the box on this page.

RULES OF THE CONTEST

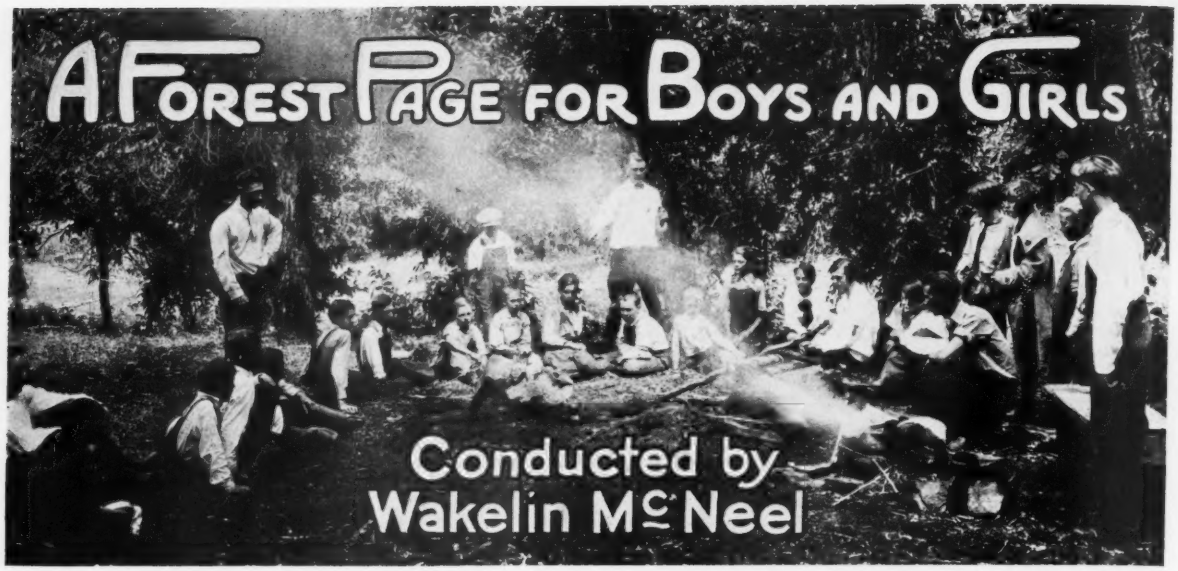
The name and address of the photographer must be printed on back of each photograph.

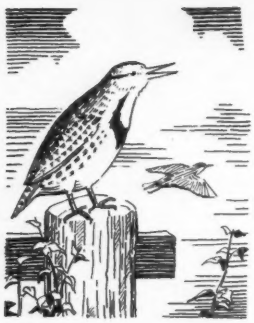
Enclose with each collection of photographs sufficient postage for return if not available. Unavailable photographs will be returned as soon as rejected by the judges, irrespective of closing dates of contests.

While every possible care will be taken, The American Forestry Association and *American Forests* cannot be responsible for any photographs that may be lost through the mails or in handling.

Upon the award of a prize or payment for photographs, the contestant surrenders all publication or other rights to The American Forestry Association.

Address all photographs to the *Picture Prize Contest Editor, American Forests*, 1727 K Street, N. W., Washington, D. C. Unless so addressed, photographs will be handled as regular material.





The School Forest

SOMEWHERE buried in the writings of Dallas Lore Sharp are his ten commandments of conservation. They made such an impression on my mind with their five "stops" and five "starts" that frequently they rise to the surface of my memory and demand repetition:

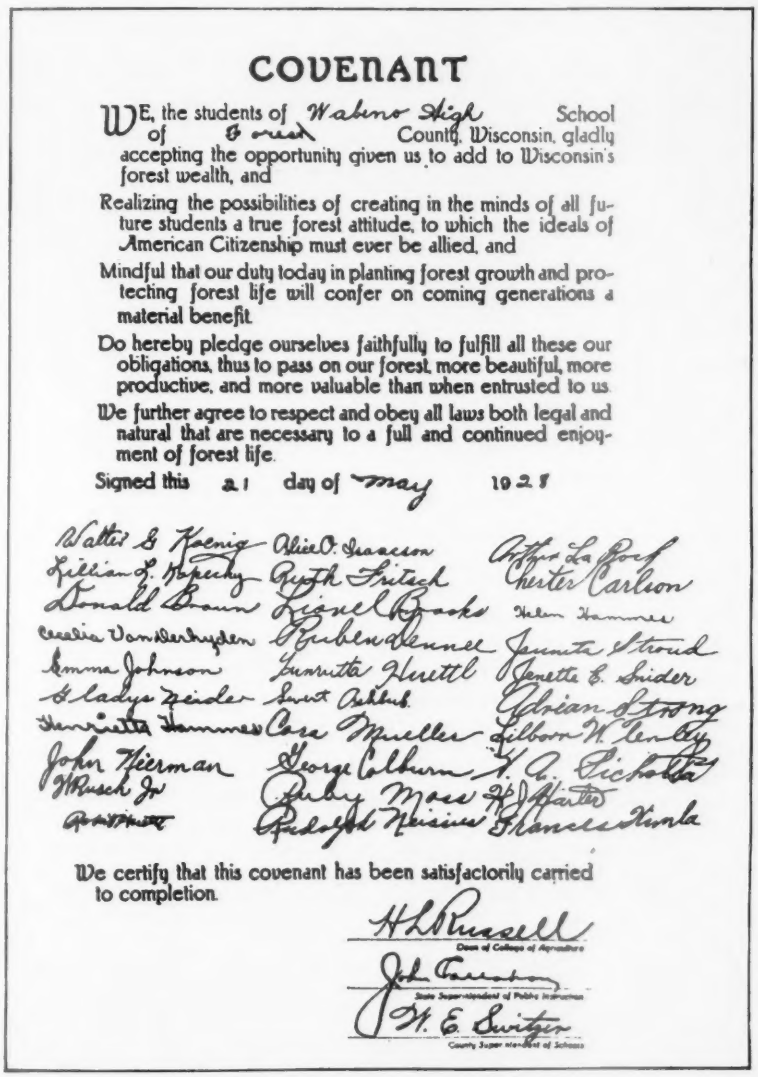
"Stop cutting and start planting.
Stop wasting and start saving.
Stop hunting and start watching.
Stop killing and start creating.
Stop hating and start loving."

These are perfectly sensible dictums. There is not a boy or girl anywhere but would say that these commandments describe just the attitude that teachers make their goal in the teaching of conservation. Every adult will say that they offer a policy for each of us within his dooryard, neighborhood, farm, or forest. They would do away with the necessity for the big stick of the law because they are based on love, and love requires no law. They would make effective such legislation as we must have because they place "I ought" before "I want." They demand that we look ahead, just as a forester must do, beyond the cash returns of the year, and think instead in terms of a civilization of a century. They would create a sensitiveness of mind that suffers when looking upon "denuded and disorderly landscapes." This condition of mind and will is called forest-mindedness. It comes as a result of getting in sympathy with a forest environment. This sympathy is born of good knowledge of the things and the phenomena in a forest environment.

Getting this knowledge requires outdoor study. The teaching of forestry, however elementary, is an out-of-doors process where relationships may be studied. The schoolroom is merely an adjunct to the out-of-doors. For effective teaching we must go where the objects are. The school forest provides the very best laboratory for creating an appreciation of forest values. If the Ponce de Leon magic of rejuvenation could be performed on me and I were given a chance to have one wish fulfilled in the second boyhood, I know that high in the list of wishes would be a chance to participate under inspiring leadership in the upbuilding of a definite tract of land—

At a School Forest dedication—the children and the parents renew their faith in trees as benefactors of mankind.

a school forest. School forests seem destined to play an important part in the reforesting movement in several states. New York took the lead a number of years ago by establishing small areas, one to ten acres, as district school forests. Michigan and Wisconsin and a number of southern states have carried on the work in larger areas long enough to know of its beneficial results. Many states have millions of acres of land in cut-over areas and in abandoned farms where family after family have tried to make income meet outgo but failed in a most heart-rending manner. It is admitted that a few thousand areas scattered here and there in school forests would utilize an almost negligible part of this land. The value of utilizing land in school forests lies in developing a forest sentiment and sympathy by having boys and girls build up their heritage of forests. It provides training in forest manners and in the scientific principles that underlie forest development. It is a dramatization of the protective and improvement methods that are used generally in forestry practices. The desirability of maintaining on every farm a definite area in trees is not fully appreciated by a great majority of farmers at the present time and probably the quickest way of bringing the desirability of this to their notice is by capturing the enthusiasm and directing the thinking of boys and girls. Have boys and girls and trees grow up together.



COVENANT

WE, the students of Wahno High School of Grant County, Wisconsin, gladly accepting the opportunity given us to add to Wisconsin's forest wealth, and

Realizing the possibilities of creating in the minds of all future students a true forest attitude, to which the ideals of American Citizenship must ever be allied, and

Mindful that our duty today in planting forest growth and protecting forest life will confer on coming generations a material benefit

Do hereby pledge ourselves faithfully to fulfill all these our obligations, thus to pass on our forest more beautiful, more productive, and more valuable than when entrusted to us

We further agree to respect and obey all laws both legal and natural that are necessary to a full and continued enjoyment of forest life.

Signed this 21 day of May 1928

We certify that this covenant has been satisfactorily carried to completion.

H. L. Russell
Dean of College of Agriculture

John Callahan
State Superintendent of Public Instruction

H. E. Switzer
County Superintendent of Schools

"Youth Develops Where Youth Builds"

Land for school forests is acquired by purchase or gift. In the cut-over areas lumber companies often own small tracts within proximity of schools which may be secured by persuasion or at small purchasing price. Tracts that have gone tax delinquent may be secured by paying back taxes and interest. County and town boards vote tracts to schools that will furnish evidence that the land will be used for forestry and nature study. Civic organizations which are eager to be of help to the school, buy a tract and deed it to a school. It is desirable to have the forest within easy reach of the school so that actual and frequent use may be made of it for study, recreation and for making improvements. A portion of the tract can be used wisely for picnics and recreation. Fireplaces and a council ring may be built and all building of fires limited to these places. A cabin or durable lean-to's may be constructed for over night or week-end hikes. Here may be stored the planting tools and axes.

One of the most interesting and educational enterprises is the making of a nature trail through the school forest. A nature trail is an animated museum. It may stretch along a stream, through a valley, over a hill, past a rock formation, and include unusual trees, wild flowering plants, a beautiful view and, if possible, a spring. If care is taken not to introduce artificiality, bird houses, feeding stations and bird baths may be added along the trail. If rustic woodsy material is used and the location well selected, there will be no artificiality about these features. A trailside birdbath could be made out of a stump hollowed to hold a shallow crock dish and fallen logs make excellent seats.

A person should be something of a geologist as well as a botanist to detect the possibilities of a trail, and each trail would be different. After going over the ground keep in mind the best places past which you wish the trail to run. It might be well to place conspicuous markers at these points. Then start at the place you wish the trail to begin and place conspicuous markers every twenty feet until the trail is all laid out. Go over it again and again until you are sure that it includes the most fruitful places; then with pick-ax, spade, and crowbar have pupils clear as time permits, a single file pathway. After this is done make labels to describe some of the interesting features along the trail. These can be just the simple labeling of trees, plants and rocks found along the trail, or they may be interest-arousing labels like the following found on a trail:

"You can shake hands with the five-fingered leaf of the Virginia Creeper, but poison ivy permits no familiarity."

"Shad Bush: This bush belongs to the rose family. It

blooms at the time the shad go up the rivers. The berries of this bush are edible. Some local people make 'Robin Cherry Pie' with them."

"Ragweed: This plant has the mob habit. It produces 20,000 seeds in its short season and it is the source of certain types of hay fever." A natural trail has so many possibilities for the use of the imagination, inventive abilities and curiosities of boys and girls that it is a perpetual source of interest in a school forest.

Naturally the first thing that a school would do is to make provision for the protection of the forest from fire. As soon as possible fire lanes should be cut. Tools should be acquired and put where handy but where they will not be meddled with. Along with these tools should be a number of burlap sacks which when wet are effective in stopping ground fires.

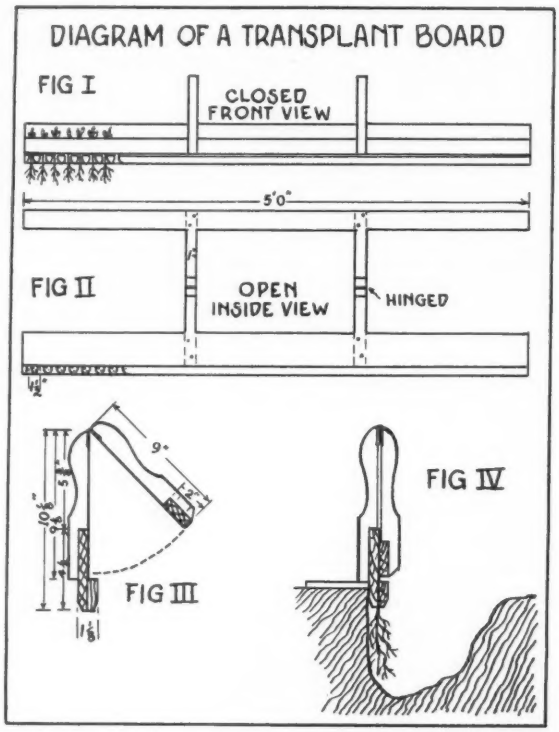
Another activity that has educational value and at the same time contributes to the development of the area is a transplant bed. We have discussed in a previous issue of this magazine the importance and best practices with respect to the transplant bed. Among the tools a school should own is the transplant board. The reader will find further on in this issue a description of the way to make a transplant board. Other activities the school could engage in are: Have pupils observe the changes that take place in certain trees from time to time as the year unfolds. This is called a tree calendar.

Pupils might make a herbarium showing the leaves of every species of tree growing in the school forest. This could also be done with tree seeds, twigs and wood specimens.

Use the forest to show how trees and forests grow, the influence of trees upon each other, the influence of different light and soil-moisture supply.

Organize a forest museum in the corner of the schoolroom and exhibit everything of educational value that the children bring from the forest.

The only body connected with a school that is legally constituted to draw up a contract is the school board. So the property is deeded to the school board, made the property of the school district, and like all school property and activities is cared for and administered by the school board. The deed should be registered at the office of the county register of deeds. Having acquired the land, a survey of the area should be made, the boundary lines blazed or otherwise defined, and a map made showing topography and tree cover. The map should define the work to be acomplished annually for at least five years. The plan of work should include the clearing of fire protection lanes, improvement cuttings and weeding to create proper forest conditions for growth of desirable species and for planting; the amount of planting to be done annually; the kind of species to be planted; and the method of planting. Of course, the work as far as advisable should be done by the school children. Often the older boys and girls organize into a distinct group for the purpose of carrying on the more difficult phases of the work and for the continued protection of the area. Success in this project depends upon capturing and holding the enthusiasm and imagination of the boys and girls.



The regulation board is six feet long, as described in the text, and this will plant forty-eight seedlings at a time.

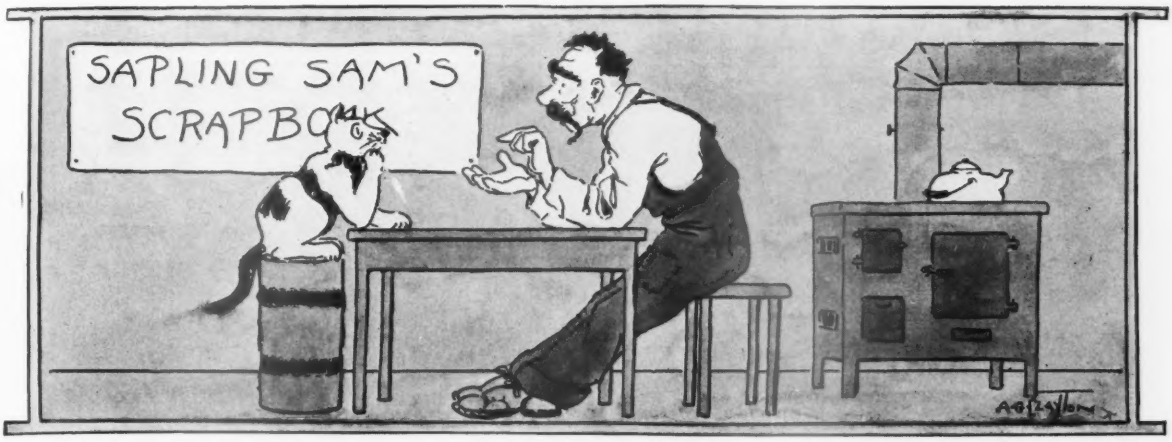
That the children may catch the spirit of this responsibility, each year somewhat previous to the planting time, they take a pledge to do their duty. The occasion of taking this pledge can be made more impressive if parents are invited in and an inspirational program held.

A convenant based upon the oath that every boy in ancient Athens was required to take is used in Wisconsin. Each child able to write his name signs the covenant. It is then hung on the wall of the school until another year has passed and the covenant is renewed.

The school board's main responsibility is to provide competent leadership. A willing teacher is the first great need and a school board should be able to meet this need. Along

(*Continuing on page* 256)

The older boys in the school learn the elements of surveying and map work by making a map of the school forest.



Take a little auto ride
To a wooded spot,
Eat your lunch and build a fire,
Then leave it while it's hot.
Help yourself to flowers and things,
Shoot a hole through an old tin can,
Now isn't that a helluva sport
To tempt a healthy man?

All argument favoring burning the woods in the spring is sound —merely sound.

Some claim woods burning is an old Chinese custom—and from what we can observe so is argument.

For 5,000 years one of the principal occupations of the Chinese has been dispensing tung oil.

No wonder the words of Confucius were soothing.

But the tung oil of Confucius is not good enough for Americans—they prefer their own nuts.

They are raising their own tung oil trees in Florida, undoubtedly to keep the spring of eternal youth in good working order.

But what Florida needs is some ointment to heal the scars of forest fires. Tung oil might help but it needs to be mixed with concrete reasoning.

All Ponce de Leon did was to search for the fountain of youth in Florida. Look what the woods burners have done to it.

And speaking of China, the *Arkansas Gazette* observes that the dove of peace has been shanghaied.

It might be a good idea for woods burners. The only command there is *Fire!*

The difference between the Chinese and a tree is that the tree can't return the fire.

Here lies the body of "Woodsburnin'" Bill
Who set out a fire on a long, sloping hill.
He burned off the grass and lots of young trees
For protection against snakes, weevils and fleas.
How well he succeeded is written right here——
And there ain't been a fire in more than a year.

The headless horseman cannot be a myth as many believe. He has taken to an automobile and every year we see him tossing burning cigarettes and matches from the windows.

Fellows like that simply can't get ahead.

The reward goes to the fellow who will not tolerate smoke. For example, in Wilkesboro, North Carolina, we are told, N. O. Smoak is vice-president of the Forest Furniture Company.

Moral: No smoke in the forest is worth a vice-presidency.

'Tis April and the streams are clear,
My tackle's ready—the season's near——

Teacher—"Now children, does anyone know how to tell a lady worm from a gentleman worm?"

Johnny—"Yes'm, I do. The lady worm never signals when she turns."

It is pointed out in *Judge* that the only fishing some people do is through the ice for cherries. The fruit of the root of evil, we suppose.

We wonder how a fish demonstrates the size of the bait he stole when he goes home in the evening?

Though George Washington was a great lover of the outdoors and an ardent huntsman, there is little to indicate that he was a fisherman. Undoubtedly he wanted the cherry tree story believed.

Which reminds us of how the Bicentennial Number of AMERICAN FORESTS inspired one of its readers:

"George Washington was a normal lad,
Not very good and not very bad.
When he chopped down papa's cherry tree
Papa was mad as he could be—
And promptly called young George with speed
To ask if he knew who did the deed.

"Said George—
'I chopped the tree with a mighty blow
Because I wanted to see what made it grow.'

"Said papa—
'And now that you've seen what made it grow
There's something else you ought to know,
And that's how much your skin can tingle
When on your breeches I wield a shingle."

—*The Smokechaser.*

ANNOUNCEMENT

Sapling Sam, the grizzled old veteran of the tall timbers who six years ago laid aside his peavy and cant hook for long shears and a paste pot, has earned a field trip. The old logger, whose scrap book has been a source of joy to many, has been assigned to swing around through the forests and logging camps and write a monthly piece on what has happened since his own red-shirted days. His characteristic slant on the many forestry and logging transformations and problems will appear in this box each month. And while the veteran is looking over old haunts and new territory, his office chair will be occupied by one who chooses to call himself "The Smokechaser."—Editor.

Favor Ammunition Tax

A cent-a-shell federal tax on all shotgun ammunition except that used in trapshooting was declared to be the most feasible means of financing an adequate waterfowl restoration program, by the Special Ways and Means Committee of the American Game Conference in its report March 10. The committee indicated that a bill asking adoption of the shell tax plan will be introduced in Congress immediately.

Stating that upwards of $7,000,000 can be collected yearly by this method and that payments would be made by each shooter in exact proportion to the amount of his shooting, the committee recommended that the returns should be divided between the federal government and the states in the following manner:

Not more than five per cent of the total should be used for additional federal administration, research and enforcement.

Fifty-five per cent of the balance should be allotted to the game departments of the various states, based on the number of hunting licenses issued by each, with the proviso that the state game departments may, upon request, refund to individuals and trapshooting clubs the amount of tax paid by them on shells used at the traps. The remainder of the funds allotted to the states would be used solely to increase game.

Forty-five per cent would be expended by the federal government for the increase of waterfowl through the acquisition or control of migratory game bird breeding, refuge and concentration areas in the United States and Canada, and the proper management of such areas.

The tax would be collected at ammunition factories, and stamps applied exactly as is done with cigarettes.

Composing the committee are Brooke Anderson, Chicago, member of the Federal Migratory Bird Advisory Board, chairman; William C. Adams, director of the Division of Fish and Game of the New York Conservation Department; David H. Madsen, of Salt Lake City, wild-life supervisor of the National Park Service; Colonel Lewis B. Ballantyne, chairman of the Fish and Game Committee of the New Jersey Assembly, and Major A. Willis Robertson, chairman of the Virginia Commission of Game and Inland Fisheries.

A Memorial to Stephen T. Mather

A bronze plaque memorial to Stephen T. Mather, late founder and director of the National Park Service, has been placed in Mount Rainier National Park. The plaque was designed by Bryant Baker, well known sculptor, for "The Stephen T. Mather Appreciation," of which John Hays Hammond is chairman.

According to the National Park Service, the plaque will be placed in the Yosemite, Yellowstone, Grand Canyon and Zion National Parks before July 4. Mr. Mather's birthday. It was also stated that plaques may be placed in other National Parks, although the dates have not been definitely set.

STEPHEN TYNG MATHER
HE LAID THE FOUNDATION OF THE NATIONAL PARK SERVICE, DEFINING AND ESTABLISHING THE POLICIES UNDER WHICH ITS AREAS SHALL BE DEVELOPED AND CONSERVED UNIMPAIRED FOR FUTURE GENERATIONS. THERE WILL NEVER COME AN END TO THE GOOD THAT HE HAS DONE.

Bryant Baker's plaque of Stephen T. Mather, to be placed in the National Parks

Mexico Plans Conservation of Timber Resources

According to a Mexican press announcement, the Ministry of Communications and the Ministry of Agriculture are working on a plan cojointly for the conservation of timber resources in Mexico, states a report from Consul Dudley G. Dwyre, at Mexico City. The program is planned to include reforestation and protection of woodlands. The Mexican lumber industry has been further curtailed due to the lack of demand and low prices. Consul Ellis A. Bonnet, of Durango, reports that in the State of Durango lumber stocks are increasing while production and prices continue to decline.

The Durango Consulate also reports that a large lumber operator has been forced to take over four more lumber yards in Monterrey, Torreon and Mazatlan, due to financial difficulties of these dealers. It is said that this will result in this company having an excellent distributing system organized.

The Durango agent of the Mexican National Railways has announced that only minimum tie deliveries will be accepted on outstanding contracts and no further contracts are expected to be placed before December, 1932.

California Will Close Forest Relief Camps

A definite indication that the unemployment situation is becoming less stringent is seen by State Forester H. B. Pratt of California, in the fact that within the last few weeks twelve per cent of the men in the forest relief camps have departed voluntarily.

Mr. Pratt announced that it is planned to shut down the forestry camps in April. They will be closed gradually, he said, perhaps being kept open until May, if funds hold out.

Complete Jackson Hole Elk Count

The famous elk herd at Jackson Hole, Wyoming, one of the largest groups of big animals within the United States, the welfare of which has been the subject of national concern for the past ten years, is increasing in numbers, according to a report received from A. C. McCain, supervisor of the Teton National Forest, Jackson Hole, Wyoming. The official count, completed March 11, places the herd at 19,855 elk, as compared with 19,238 in 1927.

The figure reported by Mr. McCain represents the number actually counted. Undoubtedly there were scattered animals missed by the officials making the census, which would indicate that 20,000 or more elk make up the herd.

Airplanes were used to supplement the usual ground count methods, Mr. McCain reported. "With the use of the plane we feel confident that we have secured a much more thorough count than at any previous time," he said. "The feed grounds were counted from the ground and returned 8,600 elk. The airplane count returned 11,255." The forest officer pointed out that after this experience with the airplane he felt safe in saying that a count of the Jackson Hole herd could be made at any time when there is snow on the ground with remarkable speed and accuracy.

The conservation of the elk at Jackson Hole became such a problem in 1927 that the herd was investigated by President Coolidge's Conference on Outdoor Recreation. The investigators found that the herd was jeopardized, many of the animals actually dying of starvation, because of an unstable winter food supply, the lack of control of annual increase in the herd, inelastic laws and insufficient coordination of responsible agencies. They recommended that under a more workable plan of game administration and appropriations for the purchase of more land for summer grazing and more food supplies for winter feeding, the range could carry no more than 20,000 head. Increases over this figure, they recommended, should be disposed of in some manner, at the discretion of game officials of the government and the state of Wyoming.

Stem Heads Walnut Association

C. B. Stem, of St. Louis, Missouri, was elected president of the American Walnut Manufacturers' Association at its annual meeting in Indianapolis late in January. V. L. Clark, of Kansas City, Missouri, was named first vice-president and Roy Amos, of Edinburg, Indiana, was elected second vice-president. S. C. Brown, of Dayton, Ohio, was named treasurer, and Burdett Green renamed secretary.

Oklahoma Devises Fire Plow

A machine combining a tractor with a middle-buster plow, has been devised and is in use by the Oklahoma Forest Service for constructing fire lines in fighting forest fires.

State Forester George R. Phillips considers this the first time that a super-fire-line plow has been adapted for forest fire service. The device will be used to cut fire lines in the forest region of southeastern Oklahoma. It will replace the use of fire rakes to make furrows from which to start backfires.

This plow, which has power enough to go almost anywhere an army tank can travel, makes a sixteen-inch clear plowline and throws dirt fifteen inches on each side, making a fireline almost four feet wide, Mr. Phillips said. It takes ten men all day to rake a line two miles long, but the new machine will make two miles an hour.

The tractor plow will be used to make a network of firelines in the present protection unit of the State.

COMBINATION BRASS NOZZLE FOR 50 FOOT STREAM OR LONG COARSE SPRAY
NEW COMBINATION HANDLE FOR CARRYING TANK AND FOR HOLDING PUMP
Pat. applied for
STRONG AND DURABLE
EXTRA HEAVY TANK IS CURVED IN SHAPE TO FIT BACK SNUG AND FIRM
ALL TANK JOINTS LOCKED AND SOLDERED
BUILT STRONG
TANK MAY BE CARRIED IN THE HAND OR ON THE BACK
INDIAN

"Mopping Up" *with* INDIAN Fire Pumps

« « « «

EVEN after extinguishing the big blaze, danger lurks in the smouldering stumps, bushes and the like. For such places INDIAN FIRE PUMPS are the ideal equipment. With 5 or 7 gallon tank strapped snugly on the back, and solid brass pump throwing 50 ft. strong stream or spray of water, INDIANS finish the job in quick order.

Above photo shows INDIAN FIRE PUMPS being used during a fierce forest and brush fire in Norton, Mass. The quick and skillful use of these portable, quick action extinguishers in this one instance saved acres of valuable timber and thousands of dollars worth of property.

Write for illustrated literature describing in detail these low priced, sturdy fire pumps. They are highly endorsed by forest rangers and fire wardens, and are unconditionally guaranteed. Thousands in use.

The new INDIAN has been improved and developed to the highest degree. A patented handle on top of the tank permits carrying the INDIAN about by hand, or it may be strapped on the back for operation. Tank is extra heavy gauge and curved in shape to fit back like a pack basket. Pump throws strong 50 ft. stream with ease. Clear water is used, no chemicals to bother with. Carrying rack available.

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405 Main Street
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Expert Service! Have your forestry work done by the men who raised the trees.

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Walsh Would Grant Public Lands With Minerals to States

The disposal of the public lands was presented in somewhat new form by Senator Thomas J. Walsh, of Montana, on March 12 in a bill, S. 4060, drawn by I. M. Brandjord, Commissioner of State Lands and Investments for the State of Montana and a member of the Committee on the Conservation and Administration of the Public Domain. This bill was introduced by Senator Walsh as a substitute for H. R. 5840 introduced by Representative John M. Evans, of Montana.

The new bill includes North Dakota and South Dakota with the eleven public land states and would grant to the accepting states, within ten years of the date of the act, all the unappropriated and unreserved public lands, including the mineral therein. With these would be included any lands eliminated from National Forests, National Parks or Monuments or other reservations. Responsibility for changing the boundaries of National Forests, National Parks or Monuments or other federal reservations to the end that the states may receive more or less of certain areas is placed upon a commission of three to be created for each accepting state. These commissions shall consist of one representative of the Department of the Interior, one of the Department of Agriculture, and one of the State office administering the land. Each commission is empowered to continue until it has completed its work, but any changes in the boundaries of the National Forests, National Parks, Monuments or other reservations are subject to the approval of the Secretary of the department then having responsibility for the lands.

No provision is made for administering the Public Domain in states which do not accept the grant, but the states which do accept them, one half of all the lands shall be designated as public school lands, the receipts from which shall be used for school purposes. The bill carries no authorization for land classification nor does it authorize appropriations.

Grazing Fees on National Forests Cut

Fees for grazing livestock on the National Forests during all of 1932 have been reduced fifty per cent in accordance with a decision announced by the Secretary of Agriculture, Arthur M. Hyde, on February 25. The decision was made after consultation with the President and is in recognition of the emergency situation facing stockmen as a result of last year's drought, the unusually heavy snows, and the prevailing hard winter.

"A careful investigation shows conclusively that stockmen of the west who have grazing privileges on our National Forests will experience great difficulty at the opening of the coming season," Secretary Hyde said.

"In many parts of the west deep snows have forced the purchase of an unusual quantity of high-priced feeds to keep flocks and herds from starvation. This, added to other emergency conditions, has persuaded us that the relief is desirable."

The average fee charged for grazing on the National Forests during the past year, 1931, was fourteen and one-half cents a month per head for cattle for an average season of five and one-half months and the average fee for sheep was four and one-half cents a head per month for an average season of three and one-half months.

"In reducing the fees an average of fifty per cent for the year 1932," the Secretary said, "more than 26.000 ranchers and stockmen will benefit. In other words, during 1932 the approximate average rate per head per month on cattle will be seven and one-half cents instead of fourteen and one-half cents and an average approximate rate per head per month on sheep will be two and one-quarter cents instead of four and one-half cents."

With receipts from grazing fees on the National Forest approximating $2,000,000 during the past year, this means a saving to the western livestock industry of nearly a million dollars. The states and counties where National Forests are located suffer losses in receipts comparable with the Forest Service because their expected returns of about $700,000 will be reduced to $350,000.

The Secretary emphasized the fact that the reduction in the prevailing rates is an emergency action solely; that the rates heretofore in effect were fair and reasonable and that the present reduction of rates is effective for one year only. The rates which prevailed in 1931 will be applied for the season of 1933.

Secretary Hyde commended the Forest Service for its general policy in administering grazing privileges. "The Forest Service has not been unmindful of the general livestock situation," he said. "It has studied various methods of altering the present system of payment without impairing its long-time administrative policy of fixing fees on a fair and reasonable basis. The present reduction must not be construed as a change in this long-time policy but as an emergency relief measure in which the Chief of the Forest Service fully concurs."

Senate Suggests Federal Aid for State Forests

The Secretary of Agriculture is requested to advise the Senate regarding the practicability of a coordinated plan for federal and state cooperation in acquiring lands suitable for forestation. This is the result of Senator Royal S. Copeland's S. Res. 175, agreed to by the Senate on March 10, the preamble of which calls attention to the fact that the United States is threatened by timber exhaustion on the basis that more than half of the softwood lumber cut in this country has been cut during the past thirty years, that the population is nearly sixty per cent greater than at the beginning of the twentieth century and that the annual cut of softwood lumber in 1928 was twenty-eight billion feet and that there now remains in the region east of the prairies only about twenty-five billion board feet of original timber.

With the passage of the resolution it was referred to the Secretary of Agriculture and a report is now in preparation.

Aid Sought for Erosion Control

A resolution asking Congress to give earnest consideration to measures which have been placed before it for the study of erosion control methods and for the actual control of erosion was adopted by the National Drainage, Conservation and Flood Control Congress at its 21st annual session held at Louisville, Kentucky, February 17, 18 and 19.

Other important resolutions endorsed the Leavitt bill, authorizing studies of forest influences in flood erosion control; federal and state legislation for forest fire control and prevention; the so-called Cochran bill, creating a separate department of public works; a comprehensive and authentic survey of the natural resources of the nation; and state legislation to facilitate the creation of state forests from suitable idle and tax delinquent farm and forest lands in the states of the Mississippi drainage area and the Gulf Coast.

The conference also passed a resolution authorizing the president of the Congress to appoint a committee of three members, one to represent forestry, one to represent geology, and one to represent engineering, to study the problem of the influence of forest cover upon the underground water supply of the nation.

Among the speakers addressing the Congress was Lewis A. Jones, chief of the Division of Drainage and Soil Erosion, United States Department of Agriculture.

New Superintendent of Zion-Bryce National Parks

The appointment by the Secretary of the Interior of Preston P. Patraw, of New York, as superintendent of Zion and Bryce Canyon National Parks, Utah, has been announced by the National Park Service.

Mr. Patraw goes to the Utah parks with a background of National Park experience. He entered the National Park Service in 1922. He became assistant to the superintendent of Hot Springs National Park where he served until 1927, when he was transferred to Grand Canyon National Park as assistant superintendent.

Born in Dickinson Center, New York, Mr. Patraw entered the Government service in 1914 and served in Washington, D. C., until 1916, when he entered the United States Army and was sent to the Canal Zone. During the World War he served in France as secretary to the late Major General C. R. Edwards, in command of the 26th Division.

In May, 1931, Mr. Patraw was married to Miss Pauline Mead, one of the few women ranger naturalists in the service of the National Parks. At that time Mrs. Patraw was serving as ranger naturalist at Grand Canyon National Park.

Hearings on Waterfowl Shortage

The Special Senate Committee on Conservation of Wild Life Resources will hold hearings on waterfowl shortage at its office in the Senate Office Building April 4, 5 and 6, it has been announced.

The Committee desires to bring out data at this hearing on the extent of a shortage in migratory waterfowl, particularly ducks and geese; the underlying causes for this shortage; the remedies the Federal Government can apply which will assist in restoring the migratory waterfowl population; the extent to which the states can assist in restoration, and the manner in which sportsmen themselves can contribute to their increase.

Maryland Reports Fire Loss

A total of 1,086 forest fires burned over 28,525 acres in Maryland in 1931, according to statistics just issued by the Maryland State Department of Forestry. The estimated damage was $100,314, and the cost of fire fighting $20,000.

Forty per cent of the fires, says the department, were caused by smokers, while brush burning was responsible for twenty-six per cent. Incendiarism caused fifteen per cent, while eight per cent were attributed to railroads. Campers caused three per cent, while the rest were miscellaneous.

Four Appointed to Research Council

Secretary of Agriculture Hyde has made four new appointments, and reappointed four former members, to the Forest Research Council of the Pacific Northwest, according to the Pacific Northwest Forest Experiment Station.

The new appointees who will serve for three years are Ossian Anderson, of the Puget Sound Pulp and Timber Company, Everett; N. C. Jamison, of the Sauk River Lumber Company, Everett; J. B. Woods, of the Long-Bell Lumber Company, Longview, and Paul Neils, of the J. Neils Lumber Company, Portland. They represent respectively the pulp and paper manufacturers, Puget Sound loggers, Columbia River loggers, and ponderosa pine manufacturers.

The Forest Research Council is a group of lumbermen and foresters in private and state employ whose function is to advise in the formulation of a program of forest research for the Northwest, to correlate the work of various agencies, and to promote in the industry the application of the findings of research in the field of forest land management and utilization of forest products.

Barnstable Club Awarded American Forestry Association Medal

The Barnstable 4-H Forestry Club, on Cape Cod, Massachusetts, was awarded The American Forestry Association medal for doing the best forestry club work in that state during the club year 1930 and 1931. Nine members, led by District Forest Warden Lincoln Crowell, of Sandwich, and County Club Agent Carl Fraser, collected and mounted or made leaf prints, and prepared wood samples of fifteen varieties of trees. The boys also made hypsometers and learned how to use them, planted five hundred trees each, and made Biltmore measuring sticks and used them. They visited a state fire tower and learned how to locate and control fires, and demonstrated the use of their hypsometers and Biltmore sticks in a pine plantation on Cape Cod.

On Arbor Day the club planted one thousand white spruce on the property of Mrs. Thomas McGrath, in Brewster, and in June they joined the other clubs of the Cape on a trip to the Harvard Forest. They camped out two nights and spent one day visiting the various parts of the college forest.

In the fall of 1930 the Barnstable Club set up an exhibit depicting the community advantages of a school forest.

New Style Fire Pump

A new style pump for fighting forest, grass and brush fires has been developed. Manufactured at Utica, New York, the new pump has a five and seven gallon capacity and is carried on the back similarly to a pack basket. It may also be carried by hand. It is capable of throwing a strong stream for a distance of fifty feet. Nothing but clear water is used in this pump, thereby doing away with the expense of chemicals.

Georgia Association Meets in June

The annual meeting of the Georgia Forestry Association will be held at Rome, Georgia, June 22 and 23. The program will deal not only with forestry, but with paper pulp research and geology. Bonnell Stone, of Oxford, has been appointed chairman of the program committee.

New Transplant Nursery for Indiana

The Indiana Department of Conservation has decided to establish a transplant nursery at the Shakamak State Park, near Jasonville. Large numbers of trees will be required to reforest open areas in this park, a considerable portion of which consists of old fields. Stock grown for planting in the park will include as large a percentage as is practicable of native hardwood species. Evergreens will be grown for planting on soils too poorly drained or too low in fertility for hardwoods.

A second purpose in establishing this nursery is to supply large transplant stock for the reforestation of stripped-over coal lands near by. It is estimated that there are more than 15,000 acres of such lands in southwestern Indiana. The coal operators have agreed on a comprehensive program for cooperative tree planting.

At the Henryville State nursery the area under cultivation has been expanded to 28 acres. In the fall of 1931 this nursery contained 19,750,000 trees, of which 1,000,000 were moved to transplant rows during that season.

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Dr. Henry B. Ward, Chairman of the Conservation Committee of the Isaak Walton League says: "This is certainly one of the finest outdoor magazines published on this continent."

Book News and Reviews

CALIFORNIA GARDENS, by Winifred Starr Dobyns, with a foreword by Myron Hunt. Published by Macmillan, New York. Price, $5.00.

This is almost entirely a pictorial presentation of a subject filled with beauty and allure. Americans, who have notably fallen under the spell of the garden, will find in this collection of photographs the choicest and most stimulating food. For they have been selected to illustrate landscape features and particular elements of design from some of the most noteworthy gardens to be found in America. Though they actually picture California gardens, the general principles of design illustrated would have wide application, and he who loves beauty and desires to study and express it in the garden will find much in this book,—wherever his home may be.

Beautifully bound, and printed on soft paper, it is a gift book, *par excellence.*—L. M. C.

BACK TO THE WOODS, by Marianne Gauss. Published by Laidlaw Brothers, New York. 269 pages—Illustrated. Price $1.50.

An interesting collection of stories about animals on the wooded slopes of the Rockies as observed by two students and lovers of the outdoors. It is simple, dignified and accurate and the stories extremely entertaining, one of the few books of this nature to truly delight. —E. K.

CAMPING AND SCOUTING LORE, by Atwood H. Townsend. Published by Harper and Brothers. 372 pages—Illustrated. Price, $3.00.

Atwood Townsend, from his broad knowledge of camping and hiking gained by actual experience in roughing it in the outdoors, gives to us an interesting book and a valuable guide to leaders of girls' and boys' clubs.

Written primarily for those between the ages of twelve and sixteen, this book is a treasure house of helpful information for every lover of the outdoors. It explains simply and clearly all questions that might arise in the mind of an amateur and contains many new suggestions for the more experienced outdoorsman. Woodcraft, nature craft, first aid for campers, campfire stunts, games and contests, and instructions for making innumerable useful articles are only a few of the different phases of the subject covered, and each is well illustrated by drawings in black and white.—J. N.

THE BIOLOGY OF THE AMPHIBIA, by G. Kingsley Noble. Published by the McGraw-Hill Book Company, New York. 577 pages—Illustrated. Price, $3.50.

This book gives a comprehensive account of both the biology and the natural history of the Amphibia as a class of vertebrate animals. All the genera of Amphibia are diagnosed and the more familiar species of American salamanders figured. Although written primarily to introduce the student to the biology of both frogs and salamanders, the book avoids technicalities wherever possible and includes much which will interest the field naturalist and the traveler.—E. K.

THE DOORWAY TO NATURE, by Raymond T. Fuller. Published by The John Day Company, New York. 284 pages. Price, $2.50.

This is a most delightful addition to nature study books for it furnishes the beginner ideas of how to start. The author believes that the secret of knowing nature lies in the habit of careful observation, beginning with the things in one's own back yard. He tells interesting facts about the more common plants and animals and gives a table of fifty plants and fifty insects, showing both their common names and their scientific names, and suggesting ways of learning each. Also there is a chapter devoted to exploding some common beliefs about snakes and poisonous plants.

The sincerity of Mr. Fuller's appreciation of nature is brought out in his introspection woven throughout the book, which adds much to its appeal and makes more contagious the author's feeling for things outdoors.—J. N.

A TREATISE ON TROUT FOR THE PROGRESSIVE ANGLER, by Charles Zibeon Southard. Published by E. P. Dutton & Company, New York. 265 pages—Illustrated. Price, $5.

The trout fisherman, expert or amateur, will find this book a thing of joy. It is the last word on trout fishing and the advice freely given by Mr. Southard, one of the greatest American authorities on this sport of kings, is pledged, if applied, to sharpen the skill of any trout fisherman.

The author not only corrects much of the current information about the trout, but he goes deeply into the subject of atmospheric surroundings, habits of fishes, the habits of trout, how to tell where fish are plentiful, how to take advantage of the fact that trout do not think or reason, and the most effective modern ways of fishing for them. It has a flare of eagerness, and the wielder of reel and rod will revel in it.—E. K.

GAME BIRD SHOOTING, by Charles Askins. Published by the Macmillan Company, New York. 307 pages. Illustrated. Price $4.00.

This book presents a comprehensive study of American game birds, written in a clear and understandable manner by one of the outstanding authorities on the subject. Captain Charles Askins has for over forty years been recognized as one of the country's best versed writers on the subject of the shotgun and its handling, and his experience has been wholly practical and from a sportsman's standpoint.

In his book will be found much valuable information as to the habits of game birds, methods of identification, and the proper course to pursue in securing satisfactory bags, as well as a strong appeal for the conservation of wild life.

It is a book that should be read by all sportsmen.—W. C. M.

AMONG THE CURRENT PUBLICATIONS

Financial Aspects of Growing Southern Pine, by E. A. Ziegler and A. R. Spillers, of the United States Forest Service, and C. H. Coulter, of the Florida Forest Service. Released by the Florida Forest Service.—A discussion of Florida's forests, forest industries and butput, forest land income and values, and forest taxation.

Planting Black Walnut, by W. R. Mattoon, Extension Forester, United States Forest Service, and C. A. Reed, Associate Pomologist, Bureau of Plant Industry. Released by the Department of Agriculture. Price, 5 cents.—Choosing soil, when to plant, what to plant, and where to get black walnuts and small trees.

The Measurement and Interpretation of Forest Fire-Weather in the Western Adirondacks, by Paul W. Stickel, Associate Silviculturist, Department of Agriculture. Released by the New York State College of Forestry, at Syracuse.—Dealing with meteorological conditions and forest fire hazards, estimating and forecasting forest fire hazards, and application of forest fire weather data to specific fire control problems.

Illinois State Parks and Memorials. Released by the Department of Public Works and Buildings, of Illinois.—An interesting presentation, well illustrated, of the parks and memorials of Illinois.

Some of the More Important Insects and Plant Diseases of Wisconsin Trees and Shrubs, by E. L. Chambers and N. F. Thompson. Released by the Wisconsin Department of Agriculture, Madison.—A detailed study of some of these destroyers.

Stumpage and Log Prices, by Henry B. Steer, Senior Forest Economist, United States Forest Service. Released by the Department of Agriculture. Price, 15 cents.—A review of prices for the calendar year 1930.

Four Years Along Connecticut Highways. Released by the Connecticut Highway Department, Hartford.—The story of the operation of the Bureau of Roadside Development of the Connecticut Highway Department.

List of Hiking and Camping Equipment. Released by the Potomac Appalachian Trail Club, Washington, D. C.—This bulletin has been prepared to answer inquiries as to the proper equipment for hiking and camping in the Blue Ridge.

Land Economic Inventory of Northern Wisconsin. Released by the Wisconsin Department of Agriculture and Markets.—A study of soils, land ownership and forest growth.

Usefulness of Birds on the Farm, by W. L. McAtee, Principal Biologist, United States Biological Survey. Released by the Department of Agriculture. Price, 5 cents.—A study of birds and their value and what should be done for their protection.

Oleoresin Production from Longleaf Pine Defoliated by Fire, by Eloise Gerry, United States Forest Service. Released by the Department of Agriculture.—Description of the test, effects of scorching foliage on tree vitality and growth, and yield notes.

Let's Know Some Trees, by Charles H. Shinn, United States Forest Service. Released by the Department of Agriculture. Price. 5 cents.—Brief description of the principal California trees.

Three New National Forest Units Designated in Wisconsin

Establishment of three new purchase units with a gross area of three-quarters of a million acres in Wisconsin has been approved by the National Forest Reservation Commission.

Land within these areas will not be purchased immediately, as no appropriations for the purpose have been made by Congress. Designation of the units, however, definitely establishes the extent of the Federal acquisition program in Wisconsin, and will enable the State to go ahead with its own forest projects without overlapping.

The new purchase units — known as the Chequamegon, Mondeau and Oconto units — comprise forest lands mostly logged over once or twice but still primarily suitable for forestry purposes. The largest is the Chequamegon unit in Ashland and Sawyer Counties comprising 376,790 acres, of which 301,432 acres is suitable for National Forest purposes. It is mostly restocked to hardwoods.

The Mondeau purchase unit lies in Taylor County and has a gross area of 172,160 acres, and a net area of 115,000 acres, of which 25,000 acres may require planting.

The Oconto unit, in Oconto and Langlade Counties, contains 204,000 acres gross and 176,000 acres net, much of which may also have to be replanted.

In addition, the Commission authorized a boundary adjustment, by which the Oneida purchase unit established in 1928 will be increased by the addition of 68,000 acres along its eastern side, in Forest and Vilas Counties. Of this area it is believed that 49,000 acres ultimately should be acquired by the Government.

Shortage of Waterfowl Reported by Government Biologists

Waterfowl flights and concentrations in various sections of the United States were generally smaller last fall than in previous years, the waterfowl investigations by the Bureau of Biological Survey show. Shortages were especially severe among canvasbacks, redheads, and lesser scaups—the birds whose breeding ranges are largely in the Northwestern States and in the Prairie Provinces of Canada, the area most seriously affected by the long drought.

In a few regions unusually large local concentrations have been observed, but these, the bureau explains, are a result of the mild weather and of the great reduction in water and food areas that followed the drought. Frequently local observers of these unusual abundances have concluded erroneously that the wildfowl must be proportionately numerous everywhere. Investigations, however, show that except in limited regions ducks were far less plentiful than in past seasons.

These investigations by the Biological Survey constitute the most comprehensive and intensive field study that has ever been undertaken to obtain reliable information on the abundance of waterfowl on their wintering grounds. Biologists have traced waterfowl migrations from early fall until the birds reached their wintering grounds. These observations have been supplemented by regular reports from other sources.

There is reason, however, to believe, the survey stated, that the emergency regulations which shortened the 1931 hunting period were generally respected by American gunners. This restraint, combined with the mild season, tending to retard southward migrations and offering little good hunting weather, has effected a considerable saving of ducks which will be able to return to the nesting grounds in the spring. The numbers of geese have been more nearly normal than those of ducks.

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If you are interested in any other camping equipment that you would like to secure without cost for a little time among your friends, drop us a line telling us what you would like to have and we will tell you the number of members necessary to secure it. There will be no obligation on your part in securing this information. Address all correspondence to **Service Department, The American Forestry Association, 1727 K St., N. W., Washington, D. C.**

Last Heath Hen, Believed Dead, Shows Up Again

The last heath hen on earth, believed to have been dead, as it had not been seen for nine months, has again been sighted near the traditional booming field of the last heath hen tribe on Martha's Vineyard Island, Massachusetts, according to the American Game Association.

Apparently in perfect health, this cock bird, sole survivor since 1928 of a species which formerly ranged the New England states in greater numbers than any other bird, returned to the farm of James Green near West Tisbury on February 9. It was observed by Mr. Green and others.

Warm weather of early spring, usually in March, has always sent the bird from its seclusion in the scrub oaks of the island, back to a meadow on the Green farm where for many years the only remaining flock of heath hens were wont to gather for their courtship antics. Although tourists still line the highway bordering the meadow to watch the last bird during his spring visits, he has not strutted, boomed and inflated the orange sacs on either side of his head since his disappointment in 1929.

Smokers Cause Most Fires in New York

Of the 1,735 forest fires which raged in New York State during 1931, a total of 918 were caused by smokers, according to the State Conservation Department.

Hunters caused 158 fires by other means than smoking; burning brush was responsible for 133; railroads caused 118; and clearing land was responsible for sixty-nine; while an equal number owed their origin to the burning of refuse. Campers caused fifty-three fires and fishermen also started fifty-three. There were fifty-two of an incendiary nature, while forty-five were communicated from burning buildings and thirty-one were caused by children. Lightning was responsible for only eleven and steam rollers caused ten, while automobiles started seven and berry pickers six. Fireworks and transmission lines caused one each.

Wiesehuegel Heads Ohio Forestry Body

E. G. Wiesehuegel, assistant professor of forestry at the Ohio State University, was elected president of the Ohio Forestry Association at its annual meeting at Columbus early in February. F. W. Dean, extension forester for the state, was named secretary-treasurer, and Willis M. Baker, director of the Central States Forest Experiment Station, was elected to the Executive Council.

The meeting featured problems of forestry and agriculture, soil erosion, farm timbers and the economic utilization of waste and idle lands. A number of woodland improvement demonstrations were given by the champion 4-H Forestry Club team.

New Air-pressure Brush Aids in Gipsy Moth Extermination

A device recently perfected by entomologists of the United States Department of Agriculture is proving a valuable weapon in the campaign against the gipsy moth in New England, where this insect has long been a menace to shade trees and other vegetation. With this new implement, an air-pressure extension brush, workmen can easily reach the moth's egg clusters, however inaccessible they may be, and thoroughly saturate them with a poisonous spray.

Since the early nineties creosote has been used to destroy gipsy moth eggs, with excellent results when it was properly applied. The methods of aplication, however, could not always be depended on for a 100 per cent kill.

The new outfit can be kept constantly wet, permits the use of a closed container for the creosote, and is time-saving and generally efficient, say the entomologists who have tested it thoroughly in the laboratory and in the field. It consists essentially of a brass cylinder, twelve and one-half inches long and two inches in diameter, a small air pump to provide the necessary pressure, a valve to release the liquid, an extension pole, and a brush connected with the tank by a gas pipe one-eighth inch in diameter.

Tree Planting on Duke Forest

Approximately 125 acres on the Duke Forest near Durham, North Carolina, were planted with 100,000 trees during February and March, according to a recent statement issued by William Maughan, assistant director of the forest. This year's work marks the completion of two years of planting with plantations covering a total of 170 acres.

Longleaf, shortleaf, and loblolly pine seedlings have been planted on about two-thirds of the area, while the remaining one-third was planted to such hardwood trees as tulip poplar, black walnut, and black locust. On a low boggy area of one and one-half acres southern cypress was planted and on another area red cedars were set out with the idea that eventually they will be marketed for Christmas trees.

All of the trees planted were one year old and were grown in the nursery of the North Carolina Department of Forestry and Conservation, near Clayton.

Alabama Plants Highway Trees

Fourteen miles of trees were planted during 1931 along the highways of Alabama by the State Commission of Forestry and the Federated Women's Clubs in carrying out a project begun in 1929 to beautify the highways. Two thousand, two hundred and fifteen trees were planted, the majority of which were water oak and live oak.

Primitive Area Designated in Forests of Colorado

About 52,000 acres of land in the Gunnison National Forest, in Colorado, have been formally designated as a "primitive area," in which no motor roads, no resorts, no summer homes or similar settlements are to be established, the Forest Service has announced.

The area will be kept as it was in 1853 when Captain John W. Gunnison with a party of surveyors crossed Cochetopa Pass seeking a feasible route for the first transcontinental railroad.

Alaska Completes Third Contest

Boys and girls of Alaska competed for the third time for The American Forestry Association medal by writing essays on the forests of Alaska. The contests were started by Governor George A. Parks in 1929, and carried on in cooperation with the Forest Service and the Office of Education. Due to the size of the territory they have been conducted in four regional divisions. This is the first time since the contest was started that essays have been received from all of the four divisions.

Winners in the Indian Schools were Anna Baxter, of Metlakatla; Reuben P. Alive, of White Mountain; Mike Kudrin, of Kashega; and Anutka Dimientieff, of Holy Cross. From the Territorial Schools the winners are Wesley Sande, of Ketchikan; James Walch, of Nome; Mary Jane Harrington, of Homer; and Roberta Steele, of Eagle.

Camp Fire Club Sees Danger in Public Domain Report

The board of governors of the Camp Fire Club of America late in February adopted two resolutions, one opposing certain recommendations of President Hoover's Committee on the Conservation and Administration of the Public Domain dealing with National Forests, and the other recommending legislation to consolidate the executive and administrative bureaus, concerned with the administration of the laws relating to the use and disposition of the Public Domain, the administration of the national reservations, and the conservation of national resources.

The resolutions are as follows:

RESOLVED, That the Board of Governors of the Camp Fire Club of America believes that so much of the recommendation numbered 5 of the report of the President's Special Committee on the Conservation and Administration of the Public Domain as provides for the creation of state boards with authority to decide what lands should be added to the National Forests and what area, if any, within existing National Forests shall be restored to the Public Domain, and so much of recommendation numbered 3 as provides that additions to the National Forests should be limited to areas chiefly valuable for forest purposes are fraught with great danger to the system of National Forests and that legislation intended to give effect to such recommendations should be opposed vigorously; and

BE IT FURTHER RESOLVED, That in the opinion of the Board of Governors of the Camp Fire Club of America so much of recommendation 20 as covers authorization to the President to consolidate and coordinate the executive and administrative bureaus, agencies and offices, created for or concerned with the administration of the laws relating to the use and disposition of the Public Domain, the administration of the national reservations, and conservation of national resources, is a wise recommendation and that legislation intended to give effect thereto should be supported.

I. F. Eldredge to Direct Forest Survey in South

Inman F. Eldredge has been chosen regional director of the Forest Survey in the South, according to the Forest Service.

This work in the Southern States is part of the nation-wide survey under the leadership of the Forest Service. The McSweeney-McNary forest research act of 1928 authorized this work which is designed to determine accurately the remaining timber supplies, the rate at which the forests are growing, the rate of depletion by cutting, fire, insects, disease, and floods, and the present and prospective needs of the people and industries of the United States for forest products. With this information it will be possible to say not only whether the United States can balance its forest products budget, but also what economic benefits through forest production may be expected from the huge acreage of forest land in this country.

Sixteen years in the Forest Service, beginning in 1909, have given Mr. Eldredge, who is a native of South Carolina, opportunity to become familiar with forest conditions and the technical and economic problems affecting forestry and the forest industries throughout the United States. During his first eight years in the Government service he was supervisor of the Choctawhatchee and Ocala National Forests, in Florida, where he pioneered in developing an improved method of turpentining which is in general use in the South today and which acted as a powerful conservation measure in curtailing the turpentining of immature trees.

Mr. Eldredge served as captain in the Tenth Engineers in France in the World War, where he became familiar with French forestry and naval stores operations in the pine region of southwestern France. For the last six years he has been forest manager of a 200,000 acre private forest property in southeastern Georgia on which he has been developing intensive forest management for naval stores, lumber, and other forest products.

Home of Audubon Saved

The house in which John James Audubon, famous naturalist of the early days, spent his last years is to be saved for posterity after having been abandoned to the wreckers, it has been announced.

The building, which stands now on a plot of land below the viaduct at Riverside Drive and 155 Street, New York, is being removed in sections to the new park site at Riverside Drive and 161 Street. There it will be restored. It was announced that the removal expenses have been underwritten anonymously and that a fund of $25,000 would be needed to complete the work of restoration.

Massachusetts Starts Forestry Notebook Contest

The Massachusetts Federation of Women's Clubs through its State Conservation Committee is encouraging boys and girls of the sixth grades throughout the state to make notebooks on forestry and compete for The American Forestry Association bronze medal. The contest is state-wide and will close on May 1, 1932, in time to announce the awards at the annual meeting of the federation at Swampscott, Massachusetts. Each school competition will have the approval of the school superintendent and will be conducted by the teachers or persons in charge of nature study.

In describing the contest, Mrs. R. E. Parmenter, chairman of the State Conservation Committee of the Massachusetts Federation of Women's Clubs, expressed the hope that it would help many children to visualize things beyond the limits of city or town parks.

The contents of the books may consist of pictures or specimens of trees, descriptions of their preservation, lumbering and uses, inhabitants of the forests, specimens or pictures of leaves, wild flowers, birds, enemies of the forests, friends of the forests, uses of wood, poems—original or copies—stories, maps, original drawings, or anything else pertaining to the forest. Each book will be judged upon the quality and quantity of material collected, its organization, and the beauty of design and construction.

Seventy-five Per Cent Increase in Visitors to Pennsylvania Forests

Visitors to the forest parks, public camps, and other recreational areas in the State Forests of Pennsylvania last year numbered nearly 1,500,000, according to Lewis E. Staley, Secretary of the Pennsylvania Department of Forests and Waters. This represents an increase of seventy-five per cent in the number of visitors over the previous year.

The increased popularity of the seventy State Forest recreational areas scattered throughout Pennsylvania is considered by State forestry officials as a public endorsement of the State park and public camp system. One reason, cited by Secretary Staley, for the great increase in the recreational use of the State Forests by citizens is the very definite back-to-nature movement. Not only does the urge to get into the woods benefit citizens owing to the health giving environment they find, but there are also distinct benefits which accrue from tourist trade.

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Connecticut Boy Wins American Forestry Association Medal

Edward J. Johnson, of Easton, Connecticut, secretary of the 4-H Forest Rangers Club, was awarded The American Forestry Association medal at the annual meeting of the Connecticut Forest and Park Association in New Haven on January 9. The large plaque, which was won last year by the William H. Hall High School, at West Hartford, as a result of Benjamin E. DeRoy's winning essay, now goes to the Easton 4-H Rangers Club.

The contest was open to boys and girls from ten to eighteen years of age for outstanding accomplishments in forest work. Edward Johnson has an evergreen plantation, a nursery of evergreen and hardwood tree seedlings, a demonstration woods where he spent twelve hours thinning out the undesirable trees, a seed collection, a wood collection. and has made fine records in contests on tree identification, chopping, target practice, and fire tower observation.

Second prizes of $5 each were awarded by the Connecticut Forest and Park Association to Louis Backsay, Albert Wilkes, and Frank Sladky, all of the Eastern 4-H Forest Rangers Club at Easton, Connecticut.

Forest Service Rechristens a Tree

The western yellow pine has had so much trouble with its name and nicknames that a board of tree genealogists consisting of the Chief Forester of the United States and the directors of eleven forest experiment stations have decided to change the name officially to "ponderosa pine" a derivative of its scientific title of *Pinus ponderosa.* Throughout its range in the western states and from British Columbia to old Mexico it has had so many local names that much confusion resulted between lumber producers and purchasers. California lumbermen have for many years been selling the lumber from this tree under the name of "California white pine." The Federal Trade Commission has issued an order to desist from using that name commercially because of possible confusion with the true white pine. Recently an appeal has been made by the lumbermen from this order, which has not yet been settled by the Commission.

Arbor Day Trees Require Care

Arbor Day, usually observed in spring in the North, is a fall or winter event in some of the southern states.

The proper season for planting trees is not the same everywhere, says the United States Forest Service. Where spring is the usual planting season—north of the parallel which passes near Norfolk, Virginia, Cairo, Illinois, and the northern boundary of Oklahoma—the right time to plant is when the frost is out of the ground and before budding or growth begins. South of this parallel, fall or winter is often the season for planting where the ground has plenty of moisture. Evergreens, however, usually do best when planted in early spring.

Trees planted for shade or ornamental purposes usually require more care than smaller seedlings set out for reforestation. The larger trees especially, according to the Forest Service, should be planted in well-worked soil, well-enriched. If they can not be set out immediately upon receipt, the first step is to prevent their roots from drying out in the air. This may be done by "heeling in" the trees—that is, burying the roots in fresh earth and packing it enough to keep them moist. Evergreens in particular, which are always transplanted with a base of earth about the roots, die quickly if the roots become dry. Before planting, cut off the ends of all broken or mutilated roots. If the tree is a broad-leaf one, prune it to a few main branches and shorten these. Do not prune tops of evergreen trees.

Dig holes large enough to accommodate the tree roots in their natural positions. Make the sides perpendicular and the bottom flat. Break up the soil in the bottom to the depth of the spade blade. Spread on the bottom several inches of good topsoil, free from sods or other undecomposed vegetable matter. On the top of this layer spread out the roots of the tree so none of them are cramped and cover them with two or three inches of fine topsoil. Firm the soil about the roots, water lightly, and after the water soaks in fill the hole with good earth, continuing to firm it but leaving the surface loose and a little higher than the surrounding soil.

When planted the trees should stand about one inch deeper than they stood in the nursery. Plant them far enough apart so that at maturity they will not be crowded.

JOURNAL OF FORESTRY

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Leaders in Nut Tree Planting Program

Although the cooperation of those who sent even five seeds into Washington headquarters is recognized by the Council in charge of nation-wide nut tree planting as the stuff of which a successful conservation program is made, there are three states of which special mention must be made, according to C. A. Reed, nut culturist of the Department of Agriculture and chairman of the project. They are Oklahoma, Virginia and Pennsylvania. Under the leadership of State Forester George R. Phillips of Oklahoma City and Scout Executive Howard B. Meyer of Tulsa, Boy Scouts gathered more than half a million seeds in the tree bearing section of the state and distributed them to Scouts for planting in the treeless sections. The Shenandoah Area Council, with headquarters at Winchester, Virginia, presented through Scout Executive Frank R. Horton 102 bushels of walnut seeds to the Council of the National Nut Tree Planting Project, and the Adams County Lone Scout Tribe of Gettysburg, Pennsylvania, turned over ninety bushels of walnuts for national distribution.

Ask the Forester?

Forestry Questions Submitted to The American Forestry Association, 1727 K St., N. W., Washington, D. C., Will be Answered in this Column. A Self-Addressed Stamped Envelope Accompanying Your Letter will Assure a Reply.

QUESTION: Please be good enough to advise if there is such a thing as a "trap" to catch Japanese beetles? Are they any good? Regarding spraying, would it be too late for this way of combatting the pest?—*E. B. B., New York City.*

ANSWER: The Department of Agriculture advises that there is a trap for catching Japanese beetles but that it is only twenty-five per cent effective. The Department does not recommend its use in lightly infested areas. The beetles are attracted to the trap by the odor of the bait used, so that a trap has the tendency of attracting beetles to a person's yard from the surrounding yards, if no traps are used in those yards.

Spraying with a solution of arsenated lead is good any time through the season. The application is described in Department of Agriculture Bulletin 363 on the Japanese beetle and its control.

QUESTION: To what extent do trees and other vegetation absorb poisons and gases?—*H. L. H., Maryland.*

ANSWER: Trees are highly susceptible to poisons in the soil, but through their leaves they are able to use carbon dioxide in the manufacture of plant food. Absorption of this by trees and other vegetation tends to reduce the impurity of the air. There is a definite limit to the amount of gases and poisons which they can absorb. The fact that certain trees do not grow well in some of the larger cities and the denudation which has occurred around certain smelters, illustrates this point.

QUESTION: The horse chestnut trees are affected by a peculiar kind of blight, which causes the leaves to turn brown and crinkle up. What is this blight and what can be done for it?—*G. R. D., New Jersey.*

ANSWER: The disease on the horse chestnut trees which you observed is common to horse chestnut trees in all parts of the world. It is known as the leaf blotch disease and bears the scientific name *Guignardia aesculi.* It is parasitic on the leaves and obtains food and nourishment by tiny root like strands which penetrate the leaves and kill the tissues. It checks the growth of the trees and occasionally causes twigs and branches to die back, but it seldom if ever proves fatal to the trees.

Partial control can be effected by collecting and burning the dead leaves as rapidly as they fall. More aggressive methods are to spray the tree with lime sulphur solution or with bordeaux mixture at the rate of one gallon to fifty gallons of water, dusting with ninety per cent finely ground sulphur and ten per cent powdered arsenate of lead has been effective. The spraying or dusting should be done first when the buds open in the spring, then two or three weeks later, and again two or three weeks later and in rainy seasons perhaps a fourth time. From the thriving condition of horse chestnuts trees in one of Washington's parks one would conclude that frequent watering and fertilizing helps make the trees resistant to the blight.

QUESTION: Will you kindly give me any information you may have in regard to the protection of shade trees by lightning rods, advisability of use, percentage of protection assured, cost, and method of installing?—*H. G. A., Illinois.*

ANSWER: Remarkable examples of the use of lightning rods on trees may be seen at Mount Vernon, in Virginia. The forty large trees which were believed to have been among those standing when George Washington occupied the mansion were equipped with one-half inch copper rods in the summer of 1923. The cost of material and labor was probably in the neighborhood of $175 for each of these trees. The copper rods were attached to the trees with copper cleats. One end was grounded several feet deep at the base of the tree, and the other end extended along the trunk up into the top most branches. The larger trees have two rods grounded on opposite sides of the trunk, and each rod branches into two or more points in the crown. During the eight years since the work was done, many of the trees have added height so as to overtop the rods, but the points remain effective.

Colonel Harrison H. Dodge, custodian of the estate, reported that the large pecan tree near the mansion was struck during a storm in August, 1930. The lightning rods were fully effective so that neither the tree nor the neighboring buildings suffered any injury.

QUESTION: I have three maple trees that seemed to be perfectly healthy last year. This year the trees only leafed out partly and one of them has absolutely dropped its leaves, and the leaves on the other two are just clinging.

Up in Westchester county, New York, I noticed the same condition, and they seemed to be having the same sort of trouble.—*G. R. D., New Jersey.*

ANSWER: The low vitality evidenced by the smaller leaves and early dropping is probably due to last year's severe drought and perhaps to some local conditions this year. The drought of last year undoubtedly retarded the trees in their assimilation of plant food so that they entered the spring with less vitality than usual. This was described in some detail in the leading article in AMERICAN FORESTS for November, 1930.

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The College owns and controls approximately 6,700 acres of Experimental Forest Lands in various sections of the State. These forest lands, together with the Roosevelt Wild Life Experiment Station at the College, offer excellent opportunities for practical work in forestry.

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FOREST RANGER RADIO BROADCAST ATTRACTING WIDE ATTENTION

"I'll tell you, son, there's a lot more to this ranger job than just riding around in a good-looking uniform——." Forest Ranger Jim Robbins is speaking. He is telling his new cub assistant, Jerry Quick, what it takes to make a ranger.

But several hundred thousand persons are also listening. Ranger Jim is being heard in every state in the union as he tells Jerry what's what; his voice is being carried on a nation-wide radio network.

The radio program, "Uncle Sam's Forest Rangers," began the first of this year and immediately made a hit. A dramatization of the work of the forest rangers, it is a continuing story built around the daily job of protecting and developing the National Forests. Forest Ranger "Jim Robbins," who is in charge of the "Pine Cone Ranger District," with his headquarters in the little village of "Winding Creek," is a veteran forester whose work in many parts of the country over a quarter of a century has brought him a wealth of experience and a kindly but practical philosophy.

Not long ago young "Jerry Quick" arrived at Winding Creek as Ranger Jim's new assistant. Fresh from college, Jerry was eager and willing, but sadly lacking in experience. The breaking-in process began immediately, and with it Jerry's troubles. He got into a near-fight with some loggers; he made some "boners" in marking timber; he was thrown from his horse. But now and then he has shown his mettle. And, incidentally he has begun to show more than passing interest in the village school teacher, Mary Halloway. Meanwhile, Bess Robbins, Ranger Jim's wife, is mothering her two "boys."

"Uncle Sam's Forest Rangers Go on the Air."—Left to Right, Arthur Jacobson, Harvey Hays, Clifford Soubier, Judith Lowry and David Lindley.

And of course there is a villain, one "Mike Bundy," who has caused trouble by his poaching and incendiary activities in the past, and no doubt may be expected to make trouble again.

Charles E. Randall, in charge of Educational Cooperation in the United States Forest Service, is writing the dramatization of "Uncle Sam's Forest Rangers." Many of the episodes, he says, are based on actual incidents in the lives of Forest Service officers, and the attempt is being made to portray the work of the forest rangers in as true-to-life a way as possible.

The program is being presented weekly by the National Broadcasting Company over a network of forty-seven radio stations in its eastern division and ten stations in the western division. Well-known radio performers on the broadcasting company's staff make up the cast. In the eastern network program, which is presented from the company's studios in Chicago, the part of Ranger Jim Robbins is played by Harvey Hays, veteran radio star, who is well-known for his interpretation of outdoor roles. Miss Judith Lowry, who came to radio after a successful career on the stage, plays the part of Bess Robbins, the Ranger's wife; and Arthur Jacobson is doing an admirable job at interpreting the vicissitudes of the young assistant ranger, Jerry Quick. Clifford Soubier, best known for his "Old Pappy" programs, plays the part of Bert Ellsworth, the Forest Supervisor, in the Forest Rangers' Program, and other incidental parts are taken by N. B. C. staff artists.

For the western division of the network, the program emanates from the San Francisco studios, with Charles MacAlister as Ranger Jim Robbins, Miss Vera Frances as Bess, and Barton Yarborough as Jerry Quick. In both the eastern and western broadcasts, an orchestra furnishes incidental music, and opens the program with the lively strains of the "Ranger Song," which is the signature piece. Sound engineers at the studios have been called upon to reproduce some unusual outdoor sound effects in connection with the drama, such as the marking and stamping of trees for cutting, and the felling of a giant of the forest.

"Uncle Sam's Forest Rangers" is on the air each Thursday at 1:00 p. m., Eastern Standard Time, on the following stations:

KDKA Pittsburgh
KFYR Bismarck
KOA Denver
KOIL Council Bluffs
KPRC Houston
KSTP St. Paul
KTBS Shreveport, La.
KTHS Hot Springs
KVOO Tulsa
KWK St. Louis
KYW Chicago
WAPI Birmingham
WBAL Baltimore
WBZ Boston
WBZA Springfield
WCKY Covington
WDAF Kansas City
WDAY Fargo
WEBC Superior
WFAA Dallas
WFLA Clearwater, Fla.
WGAR Cleveland
WHAM Rochester
WOAI San Antonio
WOC Davenport
WOW Omaha
WPTF Raleigh
WREN Lawrence
WRC Washington
WRVA Richmond
WSB Atlanta
WSM Nashville
WSMB New Orleans
WSUN St. Petersburg
WWNC Asheville
WHAS Louisville
WHO Des Moines
WIBA Madison
WIOD Miami Beach
WIS Columbia, S. C.
WJAX Jacksonville
WJDX Jackson
WJR Detroit
WJZ New York
WKY Oklahoma City
WLW Cincinnati
WMC Memphis

The same program is broadcast each Monday at 12:45, Pacific Time, from the following stations of the western division:

KECA Los Angeles
KFSD San Diego
KGHL Billings
KGO Oakland
KGIR Butte
KGW Portland
KHQ Spokane
KOMO Seattle
KSL Salt Lake City
KTAR Phoenix

That "Uncle Sam's Forest Rangers" is being well received is indicated from many quarters. Individuals and organizations throughout the country report that "fan" mail, ever increasing in size, is being received, and that the broadcast is creating great interest among the rangers.

New Highway to Connect North and South Rims of Grand Canyon

Improved motor transportation between the north and south rims of the Grand Canyon has been assured with the award of a $145,000 road-construction contract, according to the National Park Service. The fulfillment of this contract will initiate a $500,000 highway project for Grand Canyon National Park to be known as Grand Canyon East Approach.

Construction of the new highway will also afford an improved connection with near-by Mesa Verde, Zion, and Bryce Canyon National Parks and also the more northern ones, including Yellowstone.

While the road construction to be undertaken immediately covers only two sections, one between Desert View and the boundary line of Grand Canyon National Park and the other in the Waterloo Hills section, each more than three miles in length, the entire project contemplates a highway more than thirty miles long which will connect the park with United States Highway 89 at Cameron, Arizona, a distance of fifty-five miles from Flagstaff. Only federal lands, controlled either by the Indian, Forest or Park Services will be crossed throughout the entire route, which offers ready access to the Navajo Indian and Painted Desert country.

Distribution of Boyce Thompson Institute Publications

The contributions from the Boyce Thompson Institute for Plant Research, Yonkers, New York, dealing with all phases of plant research, which formerly were issued only as reprints from other journals, are now published from the Institute only and collected in yearly volumes of not less than five hundred pages. Subscribers will also receive reprints of the professional papers dealing usually with practical applications of the research work.

Persons carrying on investigations or teaching along the lines discussed, will be placed on a mailing list for notices of publications as issued, and furnished with copies on request. Others may receive such reprints at a cost of from ten to fifty cents, according to the length of the publication.

Radio for National Parks

For the purpose of conducting further tests n the field of radio wave propagation, the University of Washington has placed both the personnel and apparatus of its Scientific Research and General Engineering Departments at the disposal of the National Park Service, according to an announcement made by Ray Lyman Wilbur, Secretary of the Interior.

Experiments with radio as a means of communication in National Parks have been in progress in Mount Rainier National Park, in Washington, for some time and have demonstrated a sufficient limited use of radio as a means of communication in primitive areas such as the mountainous parks, especially in forest-fire emergencies and interrupted telephone communication caused by storms, to justify further experiments.

Mount Rainier now has the first system of radio communication ever to be established in a National Park. Late in the summer call letters for six stationary and four portable stations were assigned to Mount Rainier by the Department of Commerce.

Efforts to improve these stations and enlarge their general usefulness will be the main object of the research work to be carried on by the University of Washington in cooperation with Park Service engineers, Secretary Wilbur stated. The University is now building a radio station to aid in this work.

Bode Leaves Iowa State College

I. T. Bode, Iowa Extension Forester since 1925, has resigned his position with the Iowa State College of Agriculture to accept the position as executive secretary for the Iowa Fish and Game Commission. In his new position, Mr. Bode will direct the program of conservation being worked out for the State of Iowa.

Mr. Bode was graduated from the School of Forestry, Iowa State College of Agriculture, in 1915. After experience with the United States Forest Service, including administration of the forest nursery at Fort Hayes, Kansas, he accepted a position on the forestry staff of the Iowa State College of Agriculture and in 1925 took up work as Extension Forester. During this period he has carried on a program of forest planting and has encouraged the establishment of windbreaks and shelter belts over the entire state.

Minnesota Scout Troop Again Wins Association Medal

Troop 38, Boy Scouts of America, of the Highland Park Evangelical Lutheran Church, at St. Paul, Minnesota, won for the second consecutive time The American Forestry Association medal for outstanding work in forestry and conservation. The large medal mounted on black walnut remains with this troop, while a small personal medal was conferred upon Scoutmaster Ralph Hardiman in recognition of his leadership. A year ago this same troop won the medal under the leadership of Scoutmaster A. M. Kingsbury.

The report showed that Troop 38 conducted monthly meetings on forest law and the control of forest fires; six fire prevention posters prepared by members of the troop were exhibited at the Minnesota State Fair and in window displays in two St. Paul stores; a five-year program was started by planting 250 hard maple trees overlooking the Mississippi in Riverside Park; over 100,000 tree seeds were distributed to scout troops in Minnesota, Iowa and Wisconsin; and 212 trees were planted by individuals because of the boys' efforts as a part of the George Washington Bicentennial program.

A close competitor for first honors was Troop 121, of Crystal Bay, Minnesota, which received honorable mention in last year's contest. Under the leadership of Scoutmaster William S. Kelly, Jr., this troop devoted several meetings to discussion of fire prevention and forest law; camped for two days at the headwaters of the Mississippi River in Itaska State Park, where several state foresters gave them special instruction; planted 317 trees including black walnuts from the Arlington National Cemetery; and set up forestry exhibits at the County Fair and in a village store.

Mrs. J. D. Winter, representing the Outdoor Life Club of the Minnesota Federation of Women's Clubs, which cooperated with the Minnesota State Forest Service to sponsor the contest, reported a larger number of contestants than last year.

National Forests Visitors Increase in California

One million more people used the National Forests for recreation in California during 1931 than in 1930, according to the United States Forest Service. Nearly 4,000,000 people were registered.

Picnickers in the National Forests totaled 1,870,000, an increase of 697,000, and campers numbered 832,000, a gain of 173,000. Summer resort and hotel guests decreased slightly. These figures do not include transient motorists using main state and transcontinental highways passing through the National Forests. These travelers in 1931 totaled over 13,000,000.

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" Chinese,	T.	7-9" 3 yr.	1.00	5.00	40.00
CYPRESS, Jap.,	T.	7-10" 4 yr.	1.50	10.00	85.00
LARCH, Europ'n,	T.	1½' 4 yr.	1.50	7.00	50.00
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" Silver,	T.	5-8" 4 yr.	1.50	10.00	80.00
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" Col. Blue,	T.	5-7" 4 yr.	1.50	10.00	85.00
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International Forestry Congress to Meet in France

Announcement has been made that the 1932 Congress of the International Union of Forest Research Organizations will take place at Nancy, France, from the fourth to the eleventh of September, 1932. Invitations have gone forward to all members of the Union and to representatives of governments. The Congress will be divided into six sections, as follows: forest ecology and silviculture; forest technology; tropical and Mediterranean forestry; reforestation and restoration of mountain regions; forest pedology and climatology; and forest protection.

Just before the Congress opens on September 4, a ten-day field excursion has been arranged to give members a general view of the principal forest regions of France. This excursion will include the beech and Scotch pine forests of northern and central France, the Maritime pine forests near Bordeaux, the silver fir forests of the Pyrenees, the Mediterranean types of the Riviera, and the Alpine types along the frontier. The cost of this trip, it is stated, will be about $120.

During the course of the Congress several excursions will be made in the immediate neighborhood of Nancy and after the Congress three optional excursions will be available; one to the Vosges and Jury Mountains, a second to the Alps, and a third to the Mediterranean region. Full details of the meeting and the excursions may be had by addressing *Station de Recherches de l'Ecole National des Eaux et Forets, 10 Rue Girardet, Nancy, France.*

Wild Flower Society Honors Ricker

P. L. Ricker, of the Department of Agriculture, was re-elected president of the Wild Flower Preservation Society at its recent annual meeting at Washington.

Other officers were named as follows: Honorary president, Mrs. Elizabeth G. Britton, New York; vice-president, Dr. Edgar T. Wherry, University of Pennsylvania; secretary, Miss Clara M. Cheatham; treasurer, S. W. Miller; assistant treasurer, W. F. W. Herron; assistant secretary-treasurer, Mrs. P. L. Ricker, all of Washington, D. C. Directors: Dr. E. Lucy Braun, Ohio; Mrs. H. M. Crosby, and Mrs. Alexander McEwan, Washington; Professor M. C. Quillan, Macon, Georgia; Professor W. C. Muenscher, Cornell University; Mrs. C. R. Hyde, Brooklyn, New York; Mrs. E. H. Bouton, Baltimore, Maryland; Miss Catherine A. Mitchell, Riverside, Illinois; Mrs. Theodore Knappen, Alvah Godding, Miss Lucille Wilkinson and E. L. Crandall of Washington, D. C.

At the same meeting the Washington chapter of the society elected the following officers: Mrs. Knappen, president; Alvah Godding, vice-president, and P. L. Ricker, secretary-treasurer.

New York's Forestry Problem in 1723

An ancient document from the pen of Cadwallader Colden, Surveyor General of New York, shows that as far back as 1723 the State had a forestry problem. The report is contained in a "Documentary History of New York," conpiled in 1850.

"One of the methods already thought of for making this province more useful as to naval stores, is a severe prohibition of cutting any white pines fit for masts. No doubt the destroying of so necessary a commodity ought to be prevented and it would be difficult to frame a law with many exceptions or limitations which could be of much use; on the other hand, when the literal breach of the law becomes generally unavoidable it must lose its force.

"The lands of this Province are granted upon condition that within three years, three acres for every fifty granted be cultivated. One at first is ready to fear that the poor planter is under a sad dilemma. If he does not cultivate he cannot maintain his family and must lose his land; if he does, he cuts down trees for which he is in danger of being undone by prosecution and fines.

"The inhabitants cannot build houses without pine for boards, nor send vessels to sea without masts. It cannot surely be the intent of the legislature to put the inhabitants under such hardships by denying us timber while we live in the midst of such forests as cannot in many ages be destroyed . . . . The king for whose use these trees are preserved has not made use of one tree for many years in this Province."

After thus expressing his indignation, the writer proposes a counter solution. To prevent the decay of mast timber he suggests that everyone who improves lands on which white pines grow "ought to be obliged to plant white pines at proper distances all round his fields and inclosures and when any of these shall die or be cut down put another in its place and some officer be obliged to see this punctually done."

$4,000,000 Forest Fire Damage in North Carolina

Forest fire damage in North Carolina for the year 1931 is estimated at $4,786,225, according to the division of forestry of the State Department of Conservation and Development. This amount was more than $1,000,000 in excess of damage in any previous year on record, it was stated.

The fires of 1931 covered an area aggregating 1,720,369 acres and burned over approximately one-twelfth of the total forest area in North Carolina.

New Pulp and Paper Laboratory at Syracuse

A contract has been let for the construction of a $50,000 pulp and paper laboratory building at the New York State College of Forestry, at Syracuse. This building will house the semi-commercial pulp and paper laboratories of the college.

The new building will be of a one story and basement structure containing approximately 18,000 square feet of floor space. The building is designed to contain a general chemical analytical laboratory, a paper dye-stuff laboratory and a paper testing laboratory equipped with constant humidity and temperature control. There will also be a pulp testing laboratory, research laboratories and a semi-commercial digester room and a paper machine room.

The semi-commercial digester room will contain digesters for manufacturing pulp by the various chemical processes and the digesters will be of a size to produce from 200 to 300 pounds of chemical pulp from a single cook. It is proposed to install a sulphite digester and an alkaline pulping digester which will be used both for the soda and sulphate processes of making pulp. This digester room will also be fitted with equipment for the manufacture of acid, caustic cooking liquors and bleach liquors. It is planned to install several pieces of semi-commercial wood-preparing equipment like barkers, chippers and chip screens. A mechanical pulp grinder will also be installed.

The paper machine room will contain pulp beaters, Jordan engines and a 30-inch combination Fourdrinier and cylinder paper machine.

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White Spruce	7-yr.	2-3-2	6-12"	18
Balsam Fir	5-yr.	2-3	6-12"	15
Scotch Pine	5-yr.	2-3	18-24"	16
White Cedar	5-yr.	2-3	4- 8"	10

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FORESTRY IN CONGRESS

(Continued from page 228)

On March 8, and again on March 10, Secretary Wilbur, of the Department of the Interior, appeared before the same committee and expressed the opinion that economies can be brought about by bringing together the main subdivisions of health, education and conservation within the government under assistant secretaries. He submitted the Report of the Committee on the Conservation and Administration of the Public Domain as a suggestion for the conservation of natural resources and the consolidation and coördination of activities relating thereto. In his statement of March 10 he warned that a distinction should be made between bureaus that have incidental construction activities, and those whose major responsibility is construction work.

On March 4, representatives of a number of national associations interested in the conservation of natural resources and wild life met with Representative Ruth Bryan Owen, of Florida, and discussed the status of the Everglades National Park Bill. According to Mrs. Owen, the bill, S. 475, as introduced by Senator Fletcher, of Florida, which passed the Senate on January 19, will probably be substituted for the House bill and will be brought up for discussion on the floor of the House on March 16. If this proves impossible the bill will be brought to a vote at one of the early succeeding Wednesdays. The bill specifically states that the land shall be donated to the United States and that no appropriation of public moneys shall be made. This has resulted in little or no opposition except on the grounds that after acquiring the land annual appropriations will be required for administration and protection of the National Park. Mrs. Owen called attention to the fact that in the natural course of events the land cannot be acquired and donated to the United States in less than three to five years. The present financial difficulties of the government may then have been corrected and appropriations for purposes of this type may be made without unduly burdening the treasury.

Action by the Secretary of Agriculture in announcing a fifty per cent reduction in the fees for grazing livestock on the National Forests during 1932 has had the effect of recalling Senate Resolution 151, introduced by Senators Thomas, of Idaho, and Carey, of Wyoming.

The emergency road bill, H. R. 9642, introduced by Representative E. B. Almon, of Alabama, including $9,500,000 for forest and park highways out of a total of $135,500,000, passed the House on February 27, and was reported to the Senate on March 2, by the Committee on Post Offices and Post Roads. It is similar to one passed during the Seventy-First Session of Congress providing $80,000,000 which, together with the appropriations included through the regular channels, provided for the employment during the year of 218,359 men on Federal-aid highway systems, according to figures submitted by Thomas H. McDonald, Chief of the Bureau of Public Roads. Similarly, representatives of the Forest Service testified that they had 21,658 men at work on forest roads and trails, and comparable work in the National Parks is reported to have employed 3,604 men. On February 28, shortly after the passage of the bill by the House, Secretary Hyde issued a public statement criticizing the Democratic organization for "railroading" it through the House. Declaring that the bill had more of the aspects of the pork barrel than of relief from unemployment, the secretary said the money to be appropriated would give directly and in itself employment to only about 35,000 people. This statement, so much at variance with a presidential message to Congress on December 4, 1930, and figures submitted by the Chief of the Bureau of Public Roads, has brought the bill into the forefront of Congressional discussion.

THE CROSS
CHARLES L. C. O'DONNELL

When Christ went up the April roads
The winds of April wept,
But through the woodway's early buds
Triumphant murmur swept:
"On every height while time shall be
Shall shine the glory of a Tree."

(Reprinted)

INDIAN FOREST FUNDS REDUCED

An amendment passed on the floor of the Senate on March 15 reduces the appropriation for the administration of timber sales on the Indian forests by $27,000. The appropriation, as passed by the House, was $140,000, but the Senate reduced it to $113,000, which is the amount available for conducting the sale of timber and for the prevention of fires on the Indian forest lands. The reduction was made at the instance of Senator Frazier, of North Dakota, chairman of the Senate Committee on Indian Affairs, and while the discussion dealt largely with the Klamath Indian Reservation, in Oregon, the reduction affects the forest activities on all of the Indian Reservations.

Testimony presented on the floor of the Senate revealed that this will take care of current timber sales but will leave nothing for road construction or fire prevention.

COME TO BALTIMORE IN MAY!

If you have not made plans to attend the Annual Meeting of The American Forestry Association, in Baltimore, Maryland, May 26 and 27, now is the time to do so. Coming at a time when the historic Eastern Shore of Maryland is in full spring bloom, and when the George Washington Bicentennial is at its height, the meeting, in addition to being one of the greatest in the history of the Association, offers many sources of enjoyment and education.

Held jointly with the Maryland Forestry Association, the sessions will bring together some of the greatest authorities on forests and waters, the keynote of the meeting. And the American Forest Banquet, to be held on the evening of May 26, promises to feature speakers of national importance. The banquet as well as the sessions will be held at the Lord Baltimore Hotel.

Come to Baltimore! The Associations will extend a warm welcome.

FEATHERS OF THE OKEFENOKEE

(*Continued from page* 218)

long time. This scene was repeated several times before the owl deliberately refused to look in our direction and finally flew across the lake.

"Well," said Stevens, "we gave him a good show, anyway. I don't believe, though, that he had sense of humor enough to appreciate it."

About one o'clock in the morning I awakened with a start and for a few seconds lay still, trying to determine what had disturbed me. Suddenly a blood-curdling scream not ten feet from the tarp made my hair stand on end. The scream changed to a "cac-cac-coo-who-who-o-o" and I must have sighed in relief. The owl drifted across the moon-lit opening in front of our bed where a whisp of smoke from the lingering campfire still curled upward and again he let out one of his fearful screams. This time I smiled to myself in the darkness, for the thought came that the tables had turned since earlier in the evening. The performance lasted about an hour before the avenger floated away in the moonlight to find a sleeping bird or a prowling mouse on one of the islands nearby.

The next morning Stevens asked, "Did you hear that confounded owl last night?"

"That," I said, "was the one without a sense of humor."

Whatever his intentions, I shall always believe that owl was "getting even" for the way we had treated him during the earlier part of the evening.

A movement to make the vast wilderness of the Okefenokee Swamp a game refuge is now under way. What more appropriate spot could be found? This primordial world in the midst of a civilized one, this wild, beautiful land of rare forests and wild life is something we should preserve and keep as long as may humanly be possible.

KIDNAPPING LILIES OF THE WILD

(*Continued from page* 227)

on a spike of exceeding grace. These are very fragrant, and usually bloom in July. Cover the plant with about four inches of soil, give it partial shade, and, if possible, a moist peaty or leafy soil.

Lilies, with their uncurbed natures, resent disturbance. Once planted, leave them alone. If there is danger of late frost after the shoots have pushed through in your garden, "cover" them with loosely laid branches, or even sticks. Do not rest these on the ground directly over the new shoots. With few exceptions, Pacific Coast lilies, even those from California, come from such high altitudes that they are accustomed to severe winters.

If the surrounding planting has been placed with care, it should be possible to leave these lilies unstaked. Lilies were born to freedom in the world's high places. A few there are with the mast like stalks of *Lilium giganteum;* but the majority sway gently, nodding their fairy secrets across forest glades or city gardens.

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The demand for Japanese Flowering Cherries for this purpose is Nation-wide. Garden Clubs, Park Systems and individuals are sending us orders for Government Inspected and Certified Japanese Roseflowering Cherries to be planted as a tribute to George Washington. Special prices for community plantings. Catalog.

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RHODODENDRONS, Natives, 1 to 6 feet
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Conservation Calendar in Congress

Published monthly while Congress is in session as a service to the members of The American Forestry Association. This calendar contains bills introduced between February 5 and March 5, and those introduced prior to those dates upon which any action has been taken. All bills on which the status remains unchanged will be found in AMERICAN FORESTS for January and February.

BILLS PASSED

H. R. 6660—BYRNS—First Deficiency Appropriation Bill, including $4,260,000 for fighting forest fires. Approved February 2, 1932.

S. 457—THOMAS—Authorizing an addition to the Cache National Forest, Idaho. Approved February 25.

S. 1089—SWANSON—To establish a minimum area of 160,000,000 acres for the Shenandoah National Park and to permit acceptance of title to lands in the four eastern national parks subject to leases for uses consistent with purposes of the proposed parks. Approved February 4.

APPROPRIATIONS

H. R. 7912—BUCHANAN—Department of Agriculture Appropriation Bill 1933. To Committee of the Whole House January 18. Report No. 106. Passed House January 27. Hearings started in Senate February 9. Reported to Senate February 18. Report No. 260. Passed Senate March 8.

H. R. 8397—TAYLOR—Interior Department Appropriation Bill 1933. To Committee of the Whole House January 25. Report No. 273. Passed House February 16. Reported to Senate March 1. Report No. 353.

FORESTS

S. 3711—JONES—Authorizing the adjustment of the boundaries of the Chelan National Forest, in State of Washington. To Committee on Public Lands and Surveys February 18.

H. R. 9440—HILL—Authorizing adjustment of boundaries of Colville National Forest, in State of Washington. To Committee on Public Lands February 17.

S. 3646—SMOOT—Authorizing purchase of lands in Utah to be added to Dixie National Forest. To Committee on Public Lands and Surveys February 15.

S. 3784—BORAH—Adding certain lands to the Idaho National Forest, Idaho. To Committee on Public Lands and Surveys, February 24. H. R. 412—French.

S. J. Res. 111—JONES AND DILL—Providing for a survey for a standard highway in the Mount Baker National Forest Reserve, Washington. To Committee on Agriculture and Forestry February 24. H. J. Res. 315—Hadley.

H. R. 8548—HAWLEY—Authorizing the adjustment of boundaries of Siuslaw National Forest in Oregon. To Committee on Public Lands January 28. Reported to House March 8. Report No. 710. S. 742—McNary.

PARKS

H. R. 9970—BUTLER—Adding certain land to the Crater Lake National Park in the State of Oregon. To Committee on Public Lands March 1.

H. R. 6485—WICKERSHAM—To revise boundary of Mount McKinley National Park in Alaska. To Committee on Public Lands December 21. Reported to House January 26. Report No. 276. Passed House February 15. Reported to Senate March 3. Report No. 379. S. 3402—Walcott.

H. R. 6059—LEAVITT—Continuing the authorization for construction, reconstruction, and improvements of roads and trails in the national parks and monuments under jurisdiction of Department of Interior. To Committee on Public Lands December 16. Reported to House March 1. Report No. 641.

H. R. 4752—Establishing the Waterton-Glacier International Peace Park. To Committee on Public Lands December 8. Reported to House February 23. Report No. 593. Passed House with amendments March 7.

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PUBLIC DOMAIN

S. 2272—NYE—Granting vacant, unreserved, unappropriated, nonmineral lands to accepting States, etc. To Committee on Public Lands and Surveys December 18. Hearings scheduled to start on March 15 before the Senate Committee on Public Lands and Surveys. Representative John M. Evans of Montana, Chairman of the House Committee on Public Lands, announced that his committee would begin hearings on the companion bill H. R. 5840 shortly thereafter.

S. 4060—WALSH—Proposed a substitute for H. R. 5840 to grant vacant unreserved, unappropriated, nonmineral lands to accepting States. To Committee on Public Lands and Surveys March 12.

REORGANIZATION

H. R. 6670—COCHRAN—Providing for creation of Administration of Public Works. To Committee on Expenditures in Executive Departments January 4. Hearings started March 1.

H. R. 6665—WILLIAMSON—Establishing a Public Works Administration and transfer to and consolidate and coordinate therein all the public works activities of the Government. To Committee on Expenditures in Executive Departments. Hearings started March 1.

H. Con. Res. 20—ALLGOOD—Regarding reorganization in government departments. To Committee on Rules February 13.

H. Con. Res. 21—DISNEY—To Committee on Rules February 16.

H. J. Res. 298—SIMMONS—Authorizing the President to reorganize the executive agencies of the government. To Committee on Expenditures in Executive Departments February 17.

H. J. Res. 302—HOLADAY—To Committee on Expenditures in Executive Departments February 19.

H. J. Res. 308—MILLER—To Committee on Expenditures in Executive Departments February 20.

H. R. 9492—DALLINGER—To Committee on Expenditures in Executive Departments February 18.

H. R. 9537—RAMSEYER—To Committee on Expenditures in the Executive Departments February 19.

H. R. 9745—MAPES—To Committee on Expenditures in Executive Departments February 25.

H. R. 9749—MAPES—To Committee on Expenditures in Executive Departments February 25.

H. Res. 162—MILLER—To Committee on Expenditures in the Executive Departments February 24.

H. Res. 147—BYRNS—Establishing committee to be known as Economy Committee to study into subject of reorganization in the government departments. To Committee on Rules February 16.

H. Res. 151—Providing for appointment of Economy Committee to study into the subject of reorganization of the Government departments. To Committee on Rules February 19. Reported to House February 20. Report No. 586. Agreed to by House February 23.

H. Res. 169—BYRNS—Authorizing the Economy Committee to report to the House at any time and giving bills so reported a privileged status on the calendar. To Committee on Rules March 8. Reported to House March 10. Report No. 757.

H. Doc. 254—Consolidation of Departments of the Government. Message from the President of the United States. To Committee on Expenditures in Executive Departments February 17.

H. R. 9743—MAPES—Providing for the reorganization and more effective coordination of the Department of the Interior. To Committee on Expenditures in Executive Departments, February 25.

H. R. 9744—MAPES—Making the Bureau of the Budget an independent establishment. To Committee on Expenditures in Executive Departments February 25.

ROADS

H. R. 9642—ALMON—Authorizing supplemental appropriations for emergency highway construction, with a view to increasing employment, and carrying appropriations for construction and improvement of national-forest highways. To Committee on Roads February 23. Hearings held February 23 and 24. Reported to House February 25. Report No. 618. Passed House February 27. Reported to Senate March 2. Report No. 363.

MISCELLANEOUS

S. Con. Res. 6—WAGNER—Providing for an American Conservation Week. To Committee on Public Lands and Surveys January 8. Reported to Senate March 7. Report No. 393.

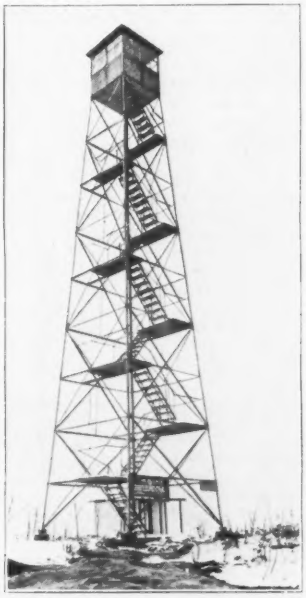
S. 2290—SHEPPARD—Providing for the conservation of rainfall in the United States. To Committee on Agriculture and Forestry December 18. Reported to Senate March 8. Report No. 403.

S. Res. 175—COPELAND—Requesting the Secretary of Agriculture to advise concerning a plan of federal aid to the states in the utilization of lands suitable for forestation. Agreed to March 10.

S. Res. 187—JONES—Authorizing the Tariff Commission to investigate foreign competitive conditions relating to all branches of the lumber industry. To Committee on Finance, March 11.

WILD LIFE

S. 3792—TYDINGS—Amending the Act of June 30, 1906, to prohibit the killing of wild birds and wild animals in the District of Columbia and establishing a game and bird sanctuary of the Potomac River. To Committee on the District of Columbia February 24.



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THE SCHOOL FOREST

(*Continued from page 236*)

the road near the entrance to the school forest the school board should erect a substantial sign, hung on posts, giving the name of the school forest, its acreage, name of donor, date of dedication and some slogan which is descriptive of the enterprise. One state uses on all its signs this slogan: "Youth Develops Where Youth Builds."

Usually there is one person in every community who is aware of the importance of these new enterprises. If he has tact and perseverance he is quite sure to get something started. One person like that is needed in every community. Here is a great opportunity to be of great help in a new leadership role.

Most states have a department of forestry with headquarters at the state capital which stands ready to assist in these enterprises often to the extent of furnishing technical help and the seedlings for planting. The colleges of agriculture in many states have extension foresters who make this work a part of their program. The work is new. It should grow slowly and prove itself as it goes.

Every school having a school forest or any boy who is doing any planting at home should make a transplant board and get the experience of planting and taking care of a transplant bed however small. Transplants have compact root systems and are more desirable for planting in the open. Look in a nursery catalog for the difference in prices between seedlings, transplants and double transplants. There are many kinds of transplant boards but the one described here will be found very satisfactory. It is made of two essential parts, two double T's, one with arms longer than the other and hinged as shown in Figure II. The shorter double T with arms nine inches long is called the clamp board, while the other, with arms ten and one-eighth inches long, is called the notch board. The former holds the seedlings in the notch board while being transplanted. Figures I and IV show the transplant board closed to hold the seedlings. Figure II shows the inside view of the board opened ready to receive the seedlings in the notches of which there are forty in all in a board that is five feet long. The regulation board is six feet, with notches one and one-half inches apart; a six-foot board will plant forty-eight seedlings at a time.

Let us see how to use a transplant board. Put the board on a bench or some support, opened up. Place seedlings in notches, roots projecting. Lower the clamp board against the notch board, thus holding seedlings in place. Carry it to the trench. Place it on a six inch board, as shown in lower right hand diagram and pack the soil against the root; then lift the clamp arm, and tip handle forward and lift up the whole machine. There is one bit of instruction which many of our readers will not need but about which it will do no harm to be emphatically reminded. Do all the work of filling the transplant board under protection from wind and sun and have this protection near the transplant bed. Seedlings whose rootlets have dried out are dead seedlings, and it doesn't take long to kill a seedling by exposure.

A six inch board is a necessary part of the operation. It enables digging a straight trench, and provides a place for the lower end of the notch arm handle to rest upon, thus gauging the depth the seedlings should be planted, at the same time a convenience as a support. This six inch board is used to measure the space between rows. The usual space is six inches. If desired wider, use a wider board.

The finished machine should be given a coat of paint, green preferred; or a good soaking in linseed oil. This will prevent warping and improve its appearance. When not in use, lay it down instead of standing it up.

WHO'S WHO

Among the Authors in This Issue

Henry S. Graves

HENRY SOLON GRAVES (*Forest Conservation as a Function of State Government*), one of the foremost foresters in the world, is Dean of the Yale Forest School, at New Haven, Connecticut, and was formerly Chief Forester of the United States. He was also at one time President of The American Forestry Association.

DR. HANS BURGER (*The Partnership of Wood and Water*) is associated with the Swiss Forest Research Institute, at Zurich, Switzerland, and one of the foremost authorities on the subject of forests and waters in Europe.

INEZ HALE MACDUFF (*An Old World Tree of Commerce*) is a native of Texas, though now living in Florida. Writing and music are her two great loves, she writes.

ANDERSON MCCULLY (*Kidnapping Lilies of the Wild*), who, out in Seattle, Washington, is Alice Woodruff Anderson McCully, is not only a writer in her own name, but is the daughter of Ada Woodruff Anderson, a well known writer of years ago. "I have a passion to make things grow," she writes, "to see what they will do, to plant seed, and to understand the growing qualities of the plants I meet."

JAMES NEVIN MILLER (*A Duck Census From the Air*) is a newspaper man of broad experience, now settled in Washington, D. C., as a feature writer. He was educated at Harvard University, and is a native of Pennsylvania.

C. N. Elliott

CHARLES NEWTON ELLIOTT (*Feathers of the Okefenokee*) is Assistant Superintendent of the forest parks of Georgia, under the Georgia Forest Service. Educated at the School of Forestry, University of Georgia, he served several years in Montana with the United States Forest Service. He is a native of Georgia.

DONALD N. CARPENTER (*Speckled Trout*) is a writer and ardent fisherman of Washington, D. C., and associated with the work of the Izaak Walton League of America. SWIFT PAINE (*A Snow Surveyor*) writes from New York City. WAKELIN MCNEEL (*A Forest Page for Boys and Girls*) is connected with boys' and girls' club work in Wisconsin, making his headquarters at Madison. G. H. COLLINGWOOD (*Forestry in Congress*) is Forester for The American Forestry Association, and ERLE KAUFFMAN (*Roots*) is the Assistant Editor of AMERICAN FORESTS.

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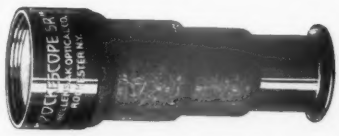

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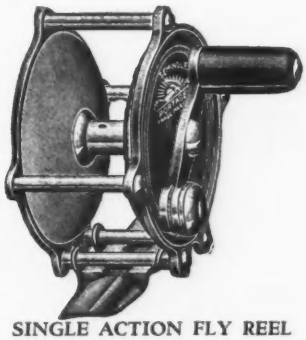

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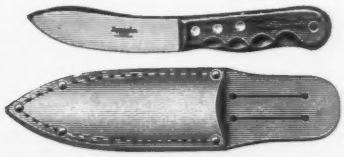

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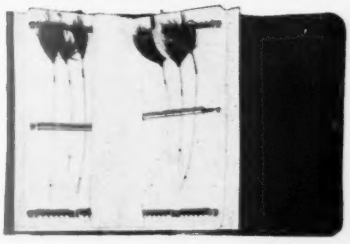

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